Vol. 135. No. 4 October, 1931 Price 25c

AMERICAN GAS JOURNAL

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Manufactured and Natural Gas.

Lux

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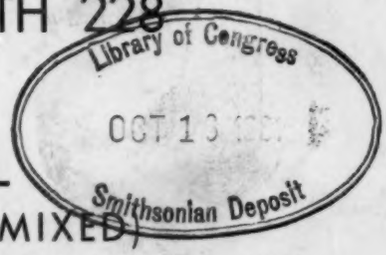

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See the Baby Digger at the A. G. A. Convention, Booths Nos. 601 and 602. See also its running mate, the Cleveland Tamper-Backfiller, the only machine of its kind. It has set up some wonderful records in the past two years.

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AMERICAN
GAS JOURNAL
Established 1859 — Pioneer of the Gas Industry

Manufactured and Natural Gas

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Vol. 135, No. 4 — October, 1931 — Whole Number 3694

TABLE OF CONTENTS

The Check-Up 35
What Happens at the Burner is What Determines Our Success 36
Can You Remember When—? 41
A Stabilizing Influence 42
Load Factor and Its Bearing Upon Gas Distribution Investment—George Wehrle 43
Engineering Cost Accounting in the Gas Manufacturing Plant—John H. Wolfe 47
The Ignition Arch Carburetor—Installation and Its Operation at Pittsfield, Mass.—Thomas A. Holden 51
The Gas Plant Goes Robot—Henry M. Riley 55
Fast Welding Cuts Line Costs—Editorial Staff Interpretation 59
Bottled Gas as a Trail Blazer—H. S. Bunn 62
Natural Gas in New York State—E. B. Swanson 65
Industrial Furnaces for Gas—Lawrence E. Biemiller 68
Air Cleaning Devices—W. E. Stark 70
An Up-to-the minute Gas Building 73
American Gas Merchandising Almanack 74
Let's Sell Some Ranges 79
Sell The Gas Refrigerator and the Other Appliances Will Take Care of Themselves—Willis Parker 80
Mass Display Moves Gas Heaters—Special Correspondent 81
Here's How 82
District Sale Nets 150 Gas Ranges in One Month 83
Children's Stories Get Reader Interest—Chas. N. Tunnell 84
The Legal Side of Our Industry—Leo T. Parker 85
Equipment News 87
News of the Gas Industry 89
Personals 91
Trade News 92

INDEX TO ADVERTISERS, PAGE 121

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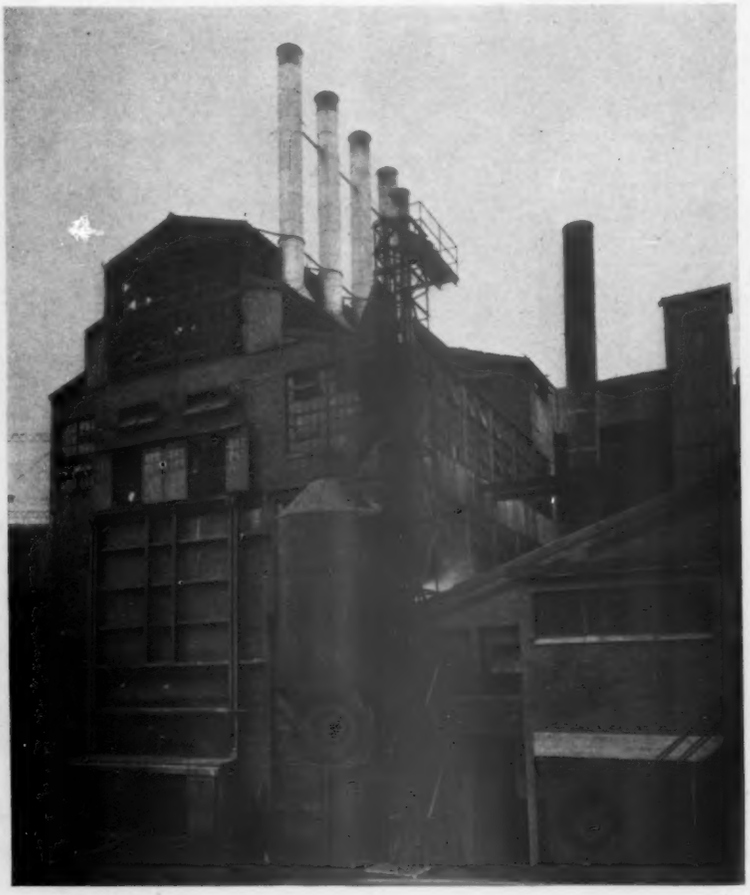
GLOVER-WEST VERTICAL RETORTS



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Let us tell you of the economy and labor-saving accomplished by the Glover-West Vertical Retort System.

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. . . Announcing **NEW**

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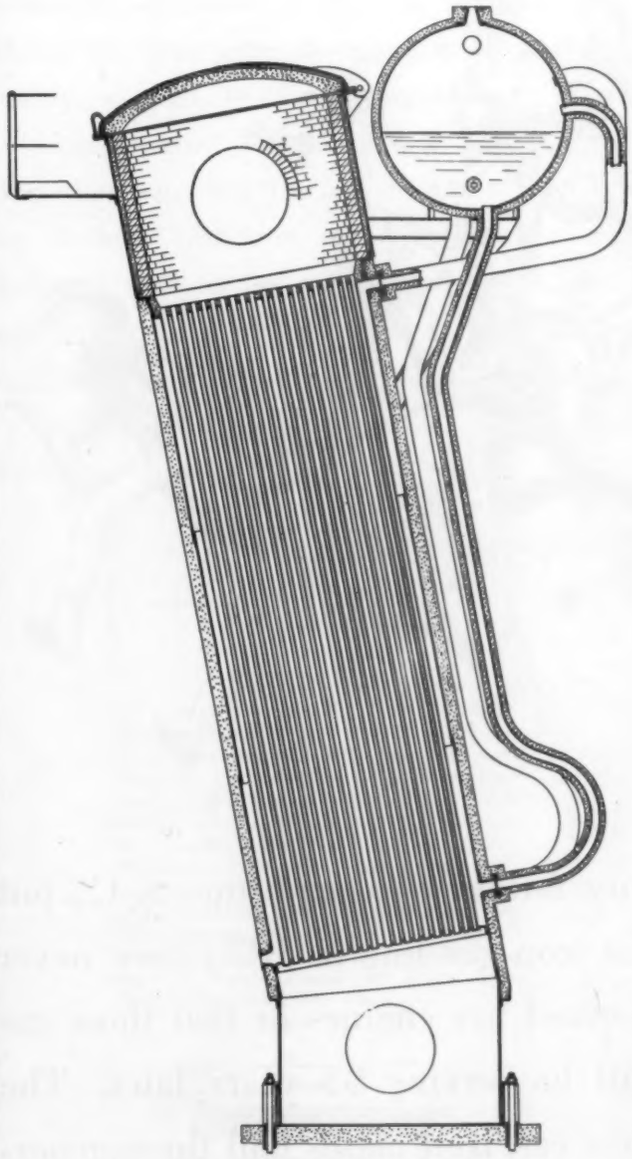

Semet-Solvay Waste Heat Boiler (*illustrated*)

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Semet-Solvay Koller Type Gas Producer

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Semet-Solvay Mechanical Water Gas Generator

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Semet-Solvay System for Carbureting Water Gas with Bunker "C" Oil

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Let us furnish you with data on these new developments and submit proposals for installation or estimates for budget purposes.

SEMET-SOLVAY ENGINEERING CORPORATION

40 Rector Street • **New York, N. Y.**

CHARLESTON'S 93-Year-old

WHEN the city fathers of Charleston, S. C., put down a cast iron gas line in 1838 they never dreamed of motorized fire engines or that those gas mains would still be serving 93 years later. The quality of old-time cast iron mains laid three generations ago in Charleston and many other cities was evidently remarkable. In 44 principal cities the age of the oldest cast iron gas mains in service averages over 64 years, and 70 per cent are *original* mains.

Gas Mains are good *but* to-day's Cast Iron Pipe is even better

BUT just as fire-fighting apparatus has improved since 1838, so also has foundry technique advanced. Today, gas engineers are offered cast iron pipe of higher, more uniform quality, as well as efficient mechanical joints for high pressure distribution. For further information regarding the advantages of specifying modern cast iron pipe for modern gas mains as well as for water, and sewer lines, road culverts and industrial needs, address The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Ill.

Efficient mechanical joints for cast iron gas mains are now in use and obtainable for high-pressure gas distribution.

Cast iron pipe bearing the "Q-check" trademark is obtainable from the following leading pipe founders: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Avenue, Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Corporation, 11 Broadway, New York.

Reg. Trade Mark

The "Q-check" symbol shown above is the registered trademark of The Cast Iron Pipe Research Association.

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AT ATLANTIC CITY—

Philfuels' Exhibit in Booths 16—17 will Present to the Gas Industry:

·1·

A PHILFUELS' PROCESS BUTANE-AIR PLANT

A complete plant in actual operation showing the extreme simplicity and practicability of the Butane-air gas process.

·2·

COMPLETE INFORMATION ON PROPANE PLANTS

Philfuels' engineers will be present with detailed and definite information to answer questions concerning undiluted propane plants; Butane gas-enrichment processes; Butane re-carburetion; and other phases of the liquefied petroleum gas industry.

·3·

AN OPERATING PROPANE DOMESTIC INSTALLATION

A complete Philgas (propane) domestic gas installation, showing how Philfuels is aiding the Gas Industry in protecting its markets.

GAS MANUFACTURING DIVISION

« PHILFUELS COMPANY »

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7-101 GENERAL MOTORS BUILDING

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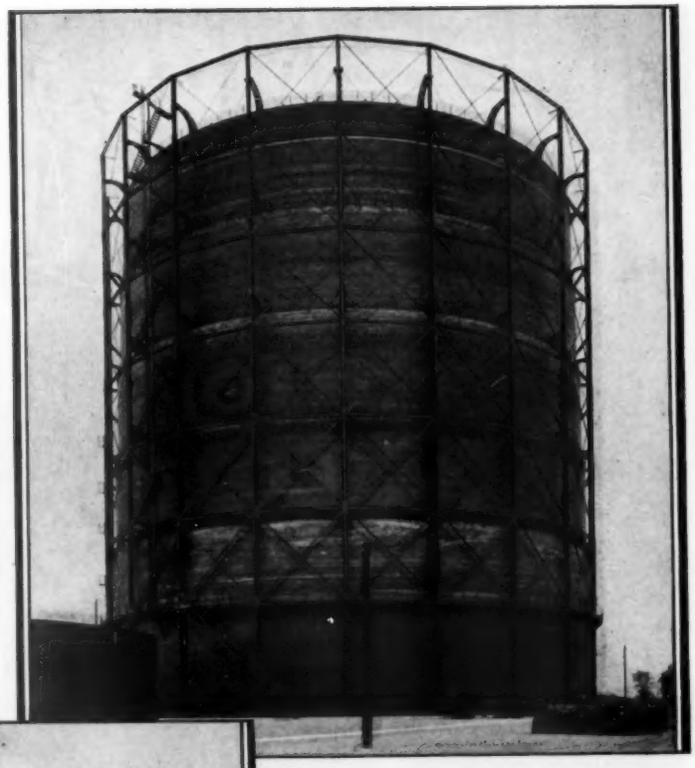
WE WILL BE GLAD TO SEE YOU!



We'll be very glad to have you visit Booth 829 . . .

We think that the Gas Convention has always been exceptional in the ability of those who attend to do two good things at once: to achieve their business purposes while gaining pleasure in meetings and greetings.

That's our reason for looking forward to this year's gathering. We know in advance that in the midst of interesting conversation about Holders, Purifiers or other equipment units . . .

there will be personal talks, brief or long or medium-sized, that will make our time very pleasant.

We repeat; we'll be very glad to see you at Booth 829.

Manufacturers of GAS HOLDERS and other major equipment units for the GAS INDUSTRY.

CRUSE-KEMPER CO.

AMBLER, PA.

LINDEWELDING

A Lindewelded 26-in. section of a 210-mile gas line in California.

. . .

Inset shows the Lindewelder, a special appliance which increases the speed of Lindewelding.

a speedier and cheaper method of OXY-ACETYLENE WELDING

ON a Lindewelded oil line in Texas, it was necessary to run the oil through before the last 15 miles were in the ditch. The line was lowered while the oil pressure ranged from 300 to 600 pounds. Not a joint failed. Lindewelds are strong.

But that is not all:

Lindewelding increases welding speed 30 to 60 per cent. and reduces welding material consumption 35 to 40 per cent.

Lindewelding can be done with ordinary blowpipes or with special apparatus which makes welding almost automatic and further increases its speed. Experienced welders quickly adapt themselves to it, and beginners learn it more readily than other methods.

Procedure Controls for this new method of oxy-acetylene welding are available to all Linde customers through Linde Process Service. Any Linde District Office will be glad to give you complete information.

See this Motion Picture on Lindewelding

Lindewelding technique differs from oxwelding technique in that it employs a special rod, a special flame adjustment, and the "back-hand" method of blowpipe manipulation. The actual steps in making a Lindewelded joint are shown in our motion picture, "The Lindeweld Process for Pipe Line Construction." This picture will be loaned without charge to pipe line officials and welding or engineering societies. It is furnished in 16 mm. and 35 mm. safety film and can be obtained by writing to any Linde District Office.

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Unit of Union Carbide and Carbon Corporation

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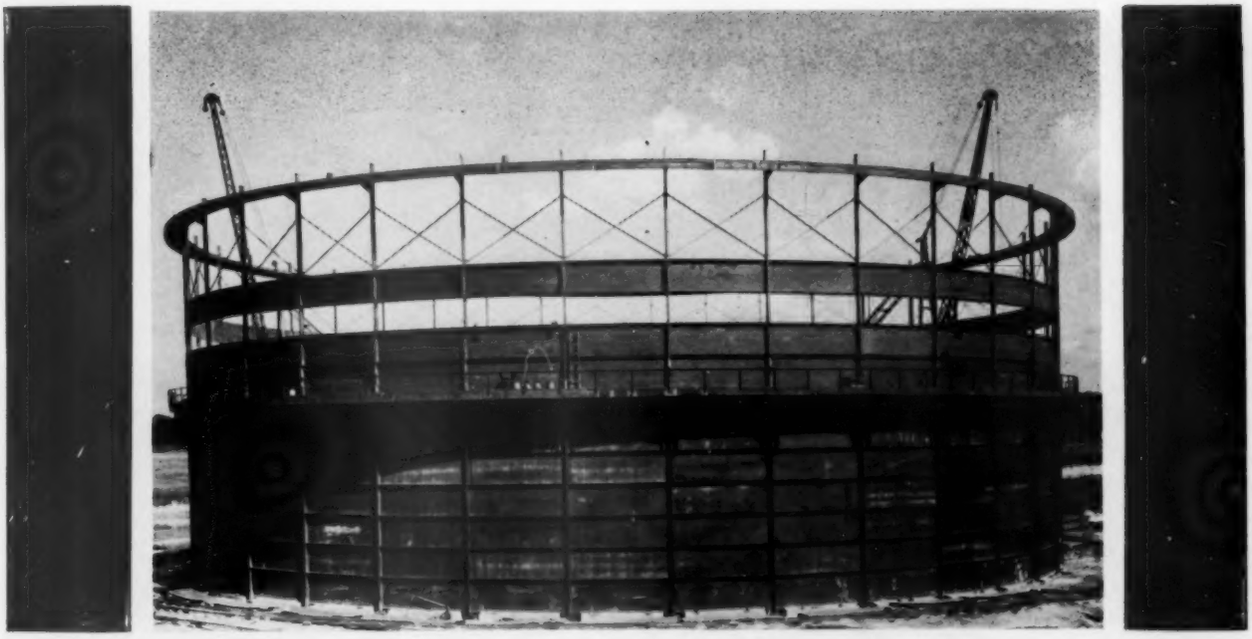

Stacey-Klonne dry seal gas holder under construction for the Syracuse Lighting Company, Syracuse, N. Y.

STACEY-KLONNE HOLDER

RISES RAPIDLY AT SYRACUSE

THE Stacey-Klonne dry seal gas holder at Syracuse, New York is rapidly mounting skyward and will soon be completed.

The outstanding savings in operation obtained through the elimination of a liquid seal with its accompanying pumps, motors and need for constant supervision, is an item that cannot be overlooked.

Many other outstanding features of design and construction materially reduce first cost and maintenance expenses.

See the model at our booth in Atlantic City. The holders are described in detail in our new Stacey-Klonne dry seal holder bulletin. May we send you a copy?

See the Stacey-Klonne Dry Gas Holder Model at the A.G.A. Convention, Atlantic City, Oct. 12-16. Booths 504-505

STACEY BROS. GAS CONSTRUCTION

DIVISION OF INTERNATIONAL-STACEY CORPORATION

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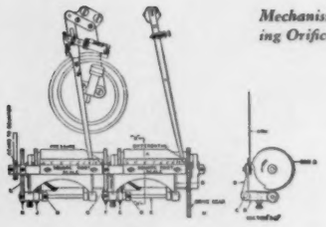
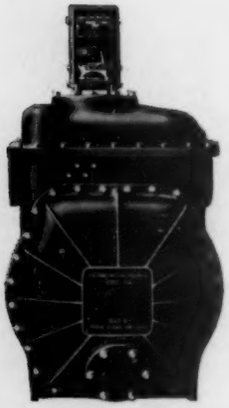
NEW PRODUCTS EXHIBITED



Mechanism of Integrating Orifice Meter.



Base Pressure Index on Ironcase Meter.

A FEW of the new products that will be seen at American Meter Company's booths. Devices and improvements in Gas Measurement Engineering that embody the results of extensive research and experiment.

INTEGRATING ORIFICE METER—Integrates, and expresses on a direct reading index, the quantity which has passed through the orifice for all rates of flow or variation in pressure.

BASE PRESSURE INDEX—Used on any type of meter and in conjunction with any type of volume or pressure gage, it gives a direct reading in cubic feet at any assumed pressure—regardless of pipe line pressure.

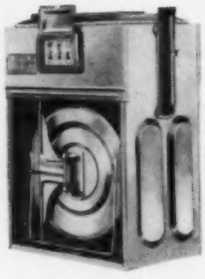
LINDERMAN ORIFICE METER—Accurate from zero to capacity. Automatically compensates for pressure, temperature, specific gravity, or rate of flow. Independent of meter speed. Occupies small space.

SALES · ALBANY · BALTIMORE · BIRMINGHAM · BOSTON · CHICAGO · DALLAS · DENVER · ERIE
SERVICE · HOUSTON · KANSAS CITY · LOS ANGELES · NEW YORK · PHILADELPHIA · PITTSBURGH · SAN FRANCISCO · TULSA

at the A.G.A. 1931 Convention Exhibit

by AMERICAN METER COMPANY

INDEX DRIVEN VOLUME AND PRESSURE GAGE—Driven by the index rather than by clock work.



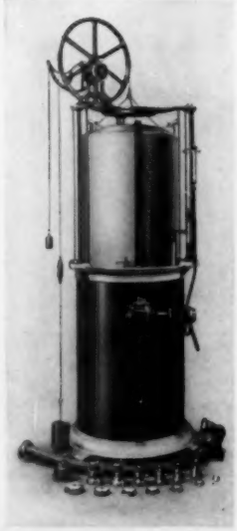
METER AND CALORIMETRY—Adapted for liquefied Petroleum (Bottled) Gases. Calorimetry burner equipped with special tip and flame spreader.

FIVE-FOOT STANDARD AMERICAN METER PROVER New style—2-inch Airways, doubled capacity.

NEW IMPROVED WET TEST METERS, PRESSURE GAGES, and other new Gas Laboratory Equipment.

SEVERAL OTHER NEW PRODUCTS—Not previously advertised to the Industry will be on display here.

New American Prover.



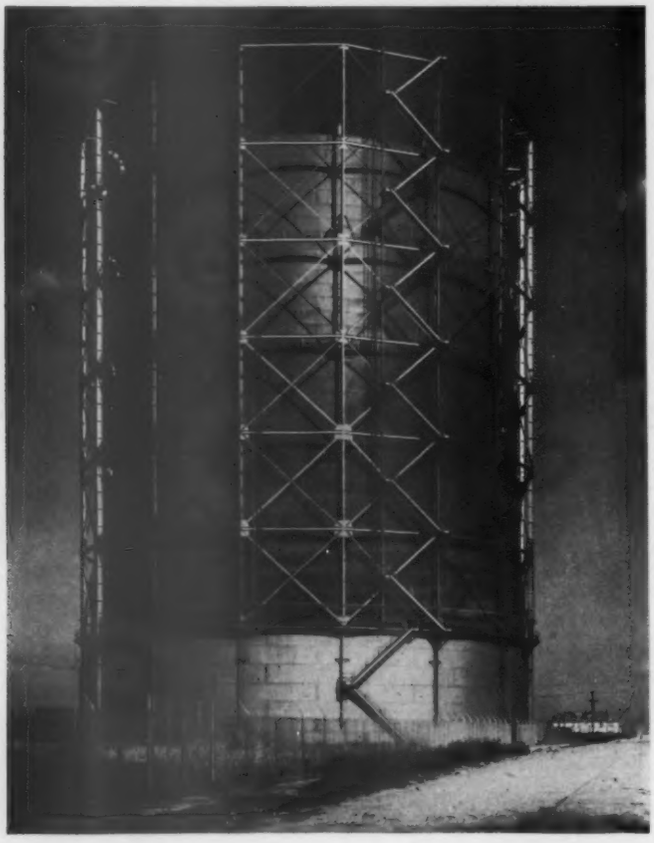
You are cordially invited to visit
Booths 323-5 and 404-6, Atlantic City Auditorium
October 12—16, 1931

AMERICAN METER CO. CUBIC FEET

JOHN J. GRIFFIN & CO. Est. 1859 · HELME & McILHENNY Est. 1848 · D. McDONALD & CO. Est. 1855 · METRIC METAL WORKS Est. 1888

MARYLAND METER WORKS Est. 1866 · NATH. TUFTS METER WORKS Est. 1860 · PACIFIC METER WORKS Est. 1901

THE BUILDERS OF STACEY



The Oldest Builders of low pressure gas holders in America

1851 · — · 1931

GAS PLANT EQUIPMENT

WELDED STEEL PIPE AND FITTINGS

CAST IRON VALVES AND FITTINGS

PURIFIERS

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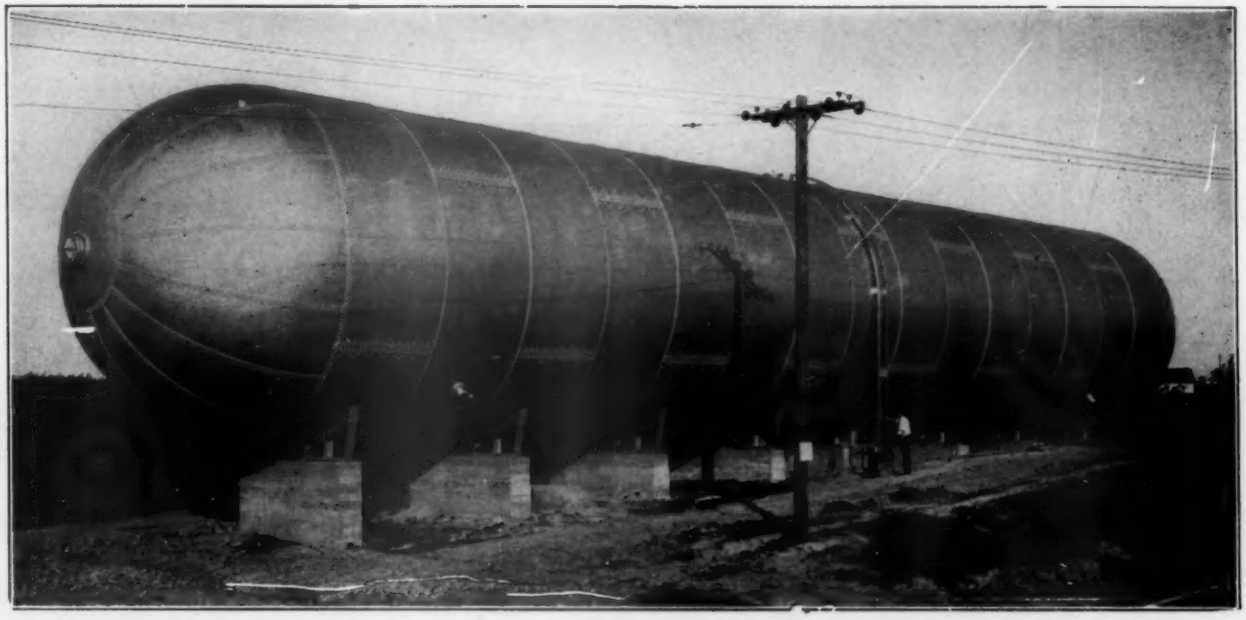
Booth 400

A.G.A. Convention

STACEY SINCE 1851

HOLDERS FOR OVER 80 YEARS



The Pioneer Builders of high pressure gas holders

1916 · — · 1931

PLATE AND STRUCTURAL STEEL WORK

We have both the experience and equipment to meet the requirements of your engineers

THE STACEY MANUFACTURING CO.

ENGINEERS AND BUILDERS

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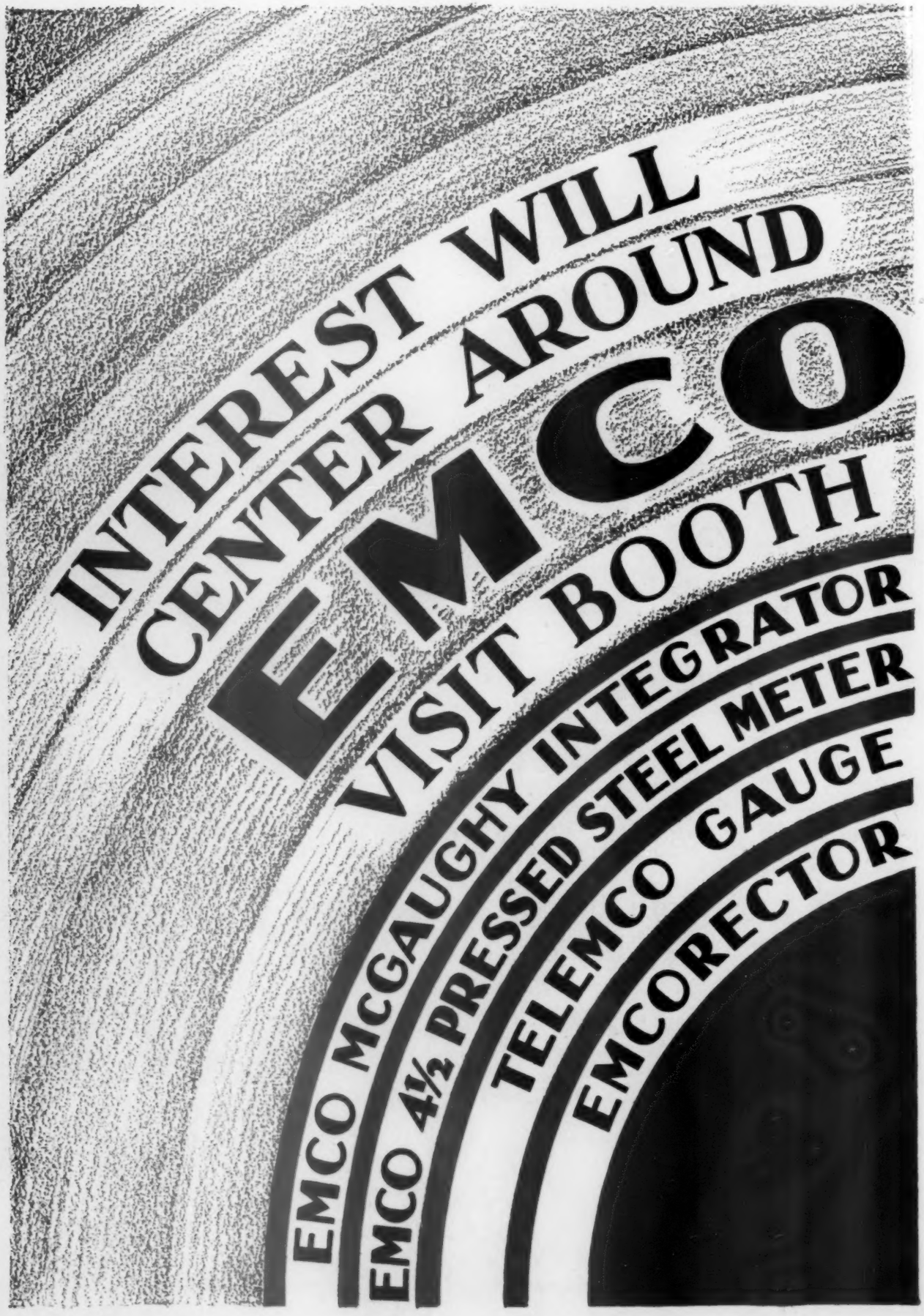
Booth 400
A.G.A. Convention

STACEY SINCE 1851


INTEREST WILL
CENTER AROUND
EMCO
VISIT BOOTH
EMCO McGAUGHY INTEGRATOR
EMCO 4½ PRESSED STEEL METER
TELEMCO GAUGE
EMCORECTOR

AT THE A.G.A.
No. 227 and 305

The EMCO McGaughy Integrator—the only known method of rapidly and accurately calculating Gas Orifice Meter charts.

EMCO 4½ Pressed Steel Meter—pressed steel construction, large diaphragm moving at slow speed, high capacity in small space due to improved valve movement.

The TELEMCO GAUGE—for remote indicating of any kind of measurements of liquids or gases over wires.

The EMCORECTOR—replaces the conventional pressure and volume gauge as generally used on high pressure meters. It gives a DIRECT READING of VOLUME CORRECTED to any base pressure, regardless of line pressure fluctuations. This eliminates the time and expense involved in making chart calculations. The correction is made automatically on small increments, thus obtaining an accuracy not possible under the chart observation method of correction.

These latest products developed and built by the Pittsburgh Equitable Meter Company, as well as other EMCO products, will be exhibited at our booths at the A. G. A. convention, Atlantic City, N. J., Oct. 12th to 16th.

PITTSBURGH EQUITABLE METER COMPANY

Main Office and Works—Pittsburgh, Pa.

NEW YORK CITY TULSA, OKLA. COLUMBIA, S. C. SEATTLE, WASH.
CHICAGO, ILL. DALLAS, TEXAS SALT LAKE CITY HOUSTON, TEXAS
LOS ANGELES, CALIF. DAVENPORT, IOWA KANSAS CITY, MO.

3 new aids in tapping gas mains under pressure

Cutting into a gas main under pressure doesn't mean trouble from irate customers any longer. MUELLER offers a simple way to eliminate the cumbersome practice of bagging off the main and cutting in a tee, thus saving you time, trouble and the necessity of interrupting the flow of gas in the main. The accompanying illustration shows how this is done—simply attach a MUELLER G-110 split sleeve around the main at the point where the connection is desired. Place the two gas-proof rubber gaskets on the machined surfaces and bolt the two halves together. The sleeve is caulked in the usual way. The valve is attached to the sleeve, opened, and the cut is made into the main. The valve is then closed, the machine withdrawn and the extension main caulked into the bell end in the sleeve. Service has not been interrupted for a moment.

This split sleeve for use in tapping mains is especially valuable when used in connection with the two new MUELLER drilling machines illustrated. Model C-1 has been developed for use with compressed air systems such as are used for breaking pavement, spading and tamping along gas lines. Two-year tests in the field have definitely proved that cuts with the C-1 are made in minutes, while old-style machines take hours and sometimes days.

The companion machine to the C-1 is the C-C which is of the same design and capacity except that it is made for hand operation.

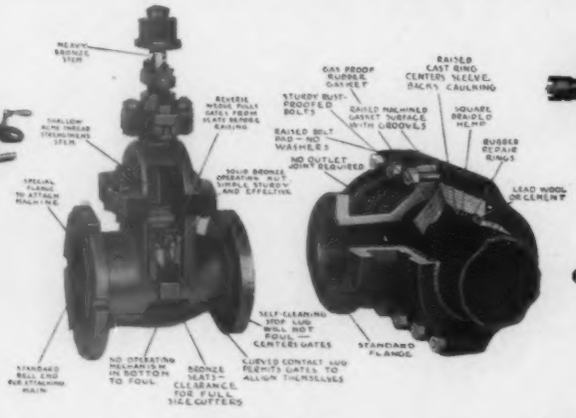
Look over these features of the new MUELLER Drilling machines and see how closely they fit your requirements.

Will make cuts 2 to 12 inches in diameter in any size main.
50% increase in capacity over any single drilling machine formerly offered.
Use of light-weight materials, telescopic drive and feed and modern design afford less bulk and weight. Working mechanism entirely enclosed in an aluminum case.
The power machine model C-1 is driven by ordinary compressed air equipment but is equipped with a worm gear which holds power under control at all times.

These new MUELLER appliances will be on display at the AGA Convention at Atlantic City in Booth 320 from October 12 to 16. Plan to see them.

MUELLER CO., (Established 1857) ***Factory:*** **Decatur, Illinois;** ***Branches:*** **New York, Dallas, Atlanta, San Francisco, Los Angeles, Chicago.** ***Canadian Factory:*** **MUELLER, Limited, Sarnia.**

C-1 Drilling Machine


HEAVY BRONZE STEM
REVERSE WEDGE PULLS GATES FROM SEATS BEFORE RAISING
SHALLOW ACME THREAD STRENGTHENS STEM
SPECIAL FLANGE TO ATTACH MACHINE
SOLID BRONZE OPERATING NUT SIMPLE, STURDY AND EFFECTIVE
STURDY DUST-PROOFED BOLTS
GAS PROOF RUBBER GASKET
RAISED CAST RING CENTERS SLEEVE, BACKS CALKING
RAISED MACHINED GASKET SURFACE WITH GROOVES
SQUARE BEADED HEAD
RAISED BOLT PAD—NO WASHERS
NO OUTLET JOINT REQUIRED
RUBBER REPAIR RINGS
LEAD WOOL OR CEMENT
SELF-CLEANING STOP LUG WILL NOT FOUL—CENTERS GATES
STANDARD FLANGE
STANDARD BELL END FOR ATTACHING MAIN
NO OPERATING MECHANISM IN BOTTOM TO FOUL
BRONZE SEATS—CLEARANCE FOR FULL SIZE GUTTERS
CURVED CONTACT LUG PERMITS GATES TO ALIGN THEMSELVES

G-110 Sleeve Valve

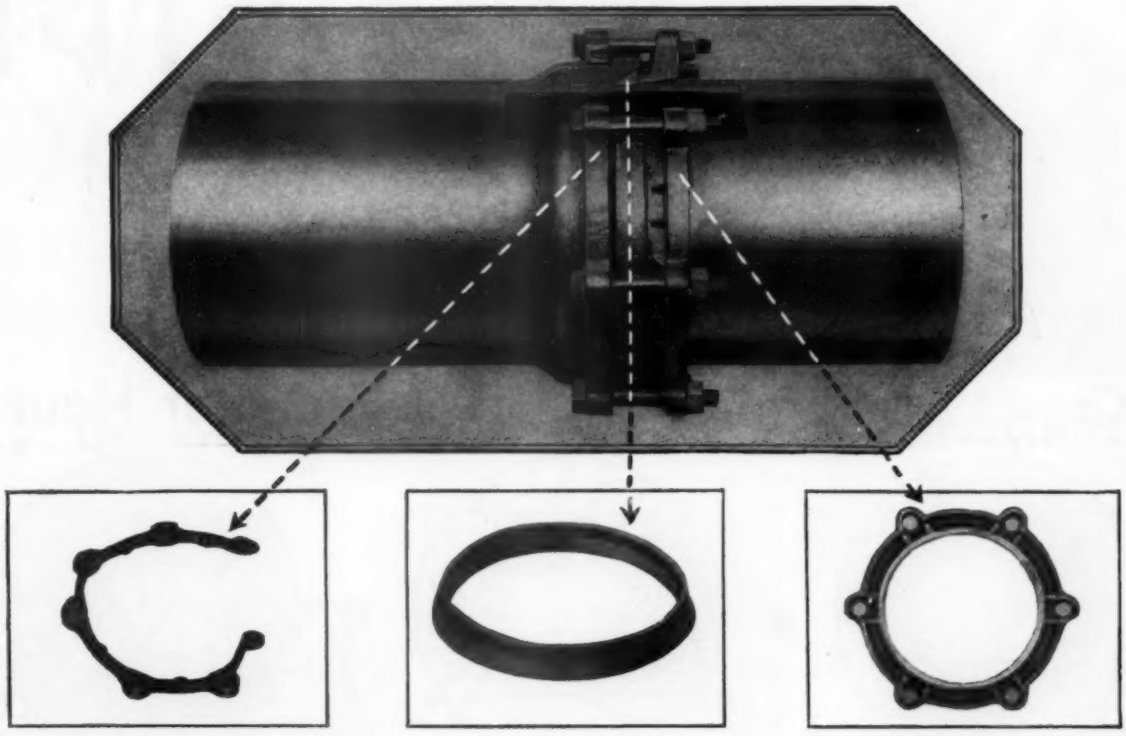
C-C Drilling Machine

MUELLER

Trade-Mark Reg. U. S. Pat. Off.

DEPENDABLE GAS BRASS SINCE 1857

This gas-tight ANTHONY JOINT
saves installation time



Only 3 parts to assemble

ENGINEERS seeking a gas-tight joint which can be quickly and easily assembled should investigate the Anthony Joint as developed and perfected by the U. S. Pipe and Foundry Company. No troublesome details about the Anthony Joint; no complicated adjustments. Simply place one gasket, tighten two rings and your joint is complete.

The Anthony Joint will remain bottle tight under high pressures too. One gas superintendent writes: "We regard deLavaud Pipe with the Anthony Joint ideal . . . The installation was subjected to 250 pounds gas pressure for four days . . . Since then, the daily pressure is from 90 to 125 pounds." Unusual deflection is another advantage which the Anthony Joint offers. With this joint you can install a line in surprisingly steep or rolling country—without the aid of bends or special fittings.

The Anthony Joint is offered in either deLavaud centrifugally cast pipe or in pit cast pipe and fittings. All rings, bolts and gaskets are interchangeable. Of special interest is the fact that Anthony Joint bends, tees and other fittings can also be used with plain end pipe. Let us send you complete information regarding the many advantages which this new joint offers.

United States Pipe and Foundry Co., Burlington, N.J.

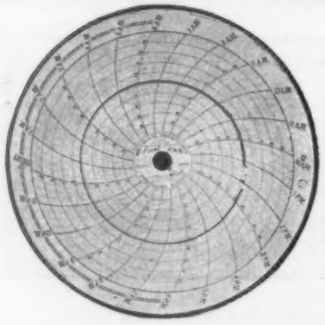
Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association

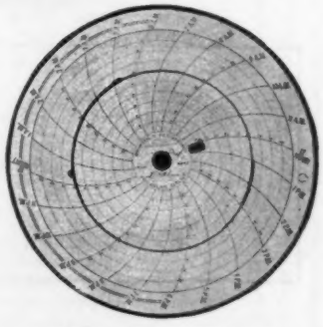
DOUBLEX SIMPLEX CAST IRON PIPE

Carries High Pressure Gas In Leak-Proof Lines Laid by Green Crews As Rapidly As 1100 Feet Per Hour

Perfect Circle at 50# Gas

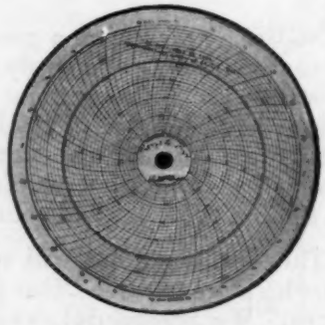


Perfect Circle at 52# Gas



Perfect Circle at 60# Gas

THESE charts of final tests on recent installations of Doublex Simplex Cast Iron Pipe lines recording "perfect circles" on pressures ranging from 50 to 105 pounds, may strike you as remarkable. They are, when judged by obsolete ideas of the pressure-carrying abilities of cast iron pipe and joints for gas service. They are not, when judged by results of accurate tests (made at our plant) which indicate that Doublex Simplex Cast Iron Pipe and the Doublex Simplex Joint are quite capable of carrying pressures exceeding 600 pounds! These installations *are* noteworthy, however, in that these pressures were carried in lines laid by green crews at laying speeds attaining 1100 feet per hour! Have you received a copy of our "Folder DX931" which describes those installations in detail? If not, address nearest Acipco office and you will receive a copy by return mail.



Perfect Circle at 105# Gas

AMERICAN CAST IRON PIPE COMPANY

BIRMINGHAM, ALABAMA

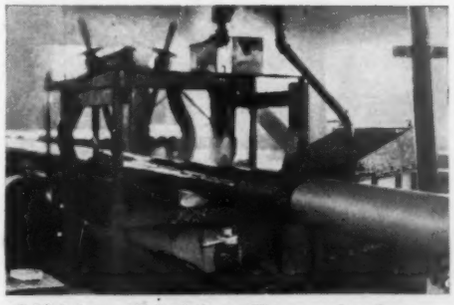
SAN FRANCISCO · DALLAS · NEW YORK CITY · CHICAGO · MINNEAPOLIS · SEATTLE · KANSAS CITY · LOS ANGELES · CLEVELAND

1031G

Wrapping J-M Asbestos Felt over hot coating on a 10-in. welded line with Johns-Manville rotary-type field machine. Note the smooth, uniform application.

wrap your pipe

. . . the one SURE way to check corrosion



J-M Asbestos Felts being mill wrapped under exact conditions of temperature control. We recommend wrapping by machine whenever possible.

BY incorporating a wrapping of J-M Asbestos Pipe Line Felts in their pipe protection, owners of more than 10,000 miles of pipe lines have obtained security against corrosion.

Years of extra service have been added by this tested protection.

The wrapping of J-M Asbestos Felts adds to the waterproofing provided by the bitumen coating. It successfully guards against electrolytic and galvanic actions. It distributes the clod pressure—takes the shear and pull of soil action that destroys unprotected coatings.

J-M Asbestos Felt provides the line with an armor of lasting protection that costs but a fraction of the cost of reconditioning.

J-M Asbestos Pipe Line Felts can be applied bonded or unbonded—by hand or by machine—in the mill, in the yard or in the field.

• • •

Johns-Manville's corps of engineers is especially qualified to discuss with you the economy of properly protecting your pipe lines. Booklet, "Safeguarding Your Pipe Line Investments," will be sent on request. Address our local office or Johns-Manville, 292 Madison Ave., New York City.

Shipment of eighteen 12-in. J-M rotary-type wrapping machines to be used on Texas Company's line from East Texas to Port Arthur.

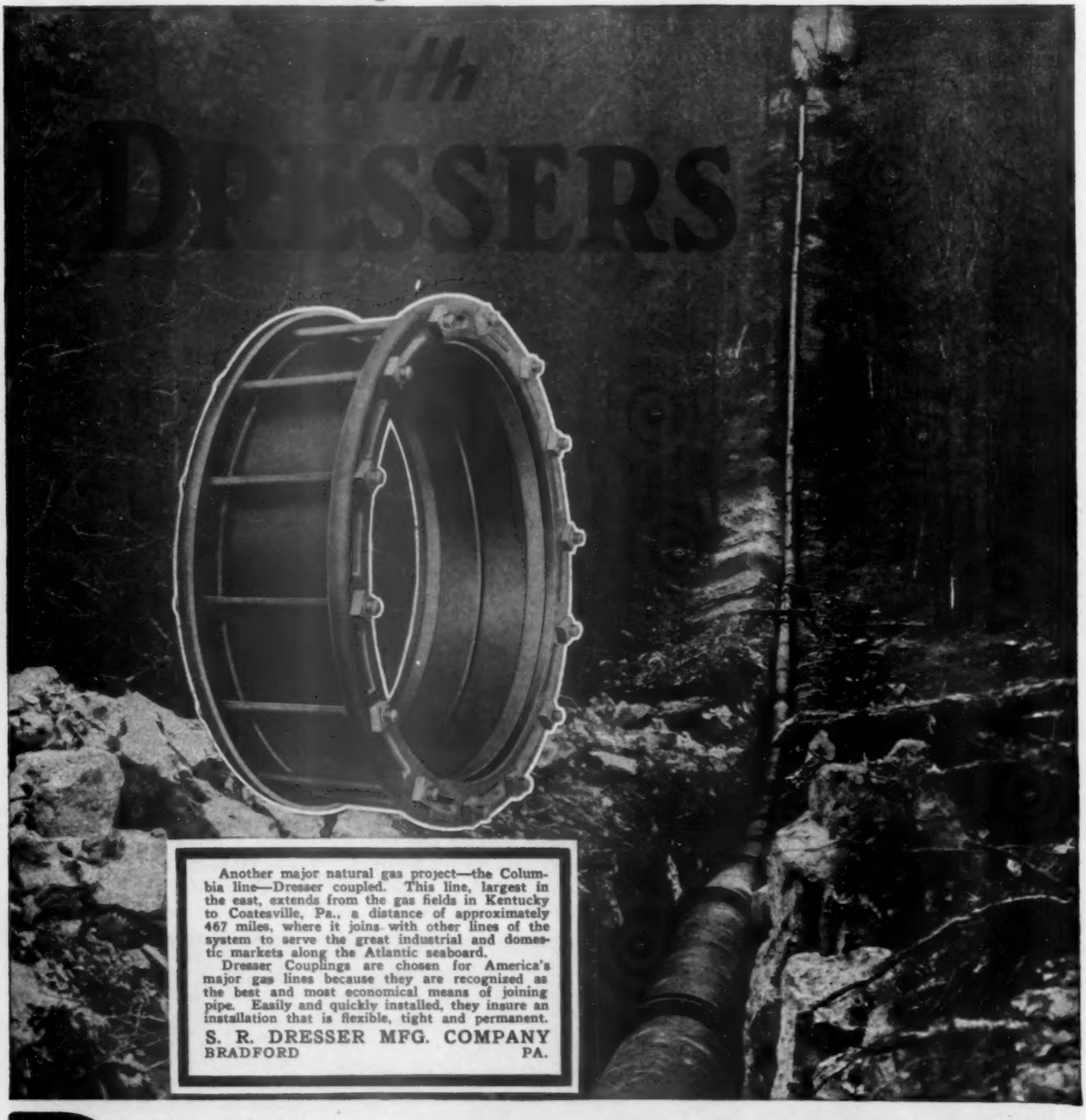
Johns-Manville

JM

Pipe Line Felts

For security against moisture penetration . . . soil stress . . . and electro-chemical action.

From Kentucky to the Eastern Markets



Another major natural gas project—the Columbia line—Dresser coupled. This line, largest in the east, extends from the gas fields in Kentucky to Coatesville, Pa., a distance of approximately 467 miles, where it joins with other lines of the system to serve the great industrial and domestic markets along the Atlantic seaboard.

Dresser Couplings are chosen for America's major gas lines because they are recognized as the best and most economical means of joining pipe. Easily and quickly installed, they insure an installation that is flexible, tight and permanent.

S. R. DRESSER MFG. COMPANY
BRADFORD PA.

DRESSER COUPLINGS Dominate!

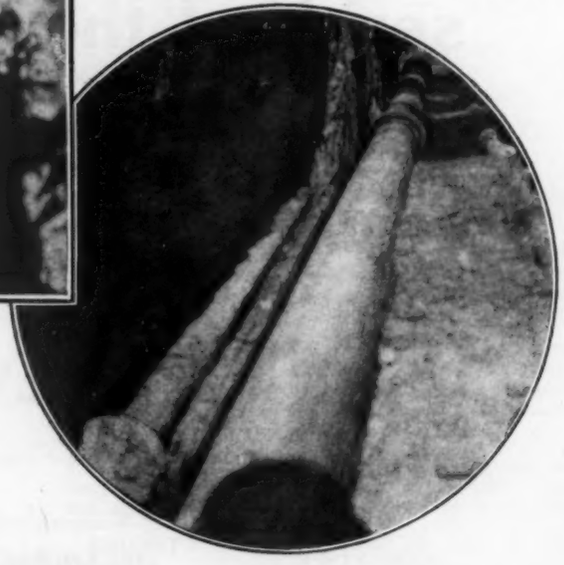
FORGET THE PRESSURE!

At the left, the two McWANE cast iron gas mains show how McWane Pipe ends worries. The small (2-inch) main with threaded McWane joints is under 25 lbs. gas pressure. The larger main (6-inch) is low pressure. Both have the same type joints. Future changes in gas pressure will involve no thought of these joints. They will serve.

A JOINT FOR EVERY PRESSURE

Users of McWane gas pipe are not limited: they may have the advantages of McWane Pipe equipped with McWane gas joints, or they may buy the pipe alone and make their own joints.

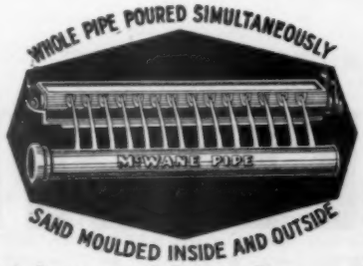
BELOW: 2-inch cast iron gas main at the left has seen over 60 years of service, and still going strong without wrapping, coating, or coddling.—An indication of what McWane small cast iron pipe can do for you.



SEE McWANE PIPE AT ATLANTIC CITY

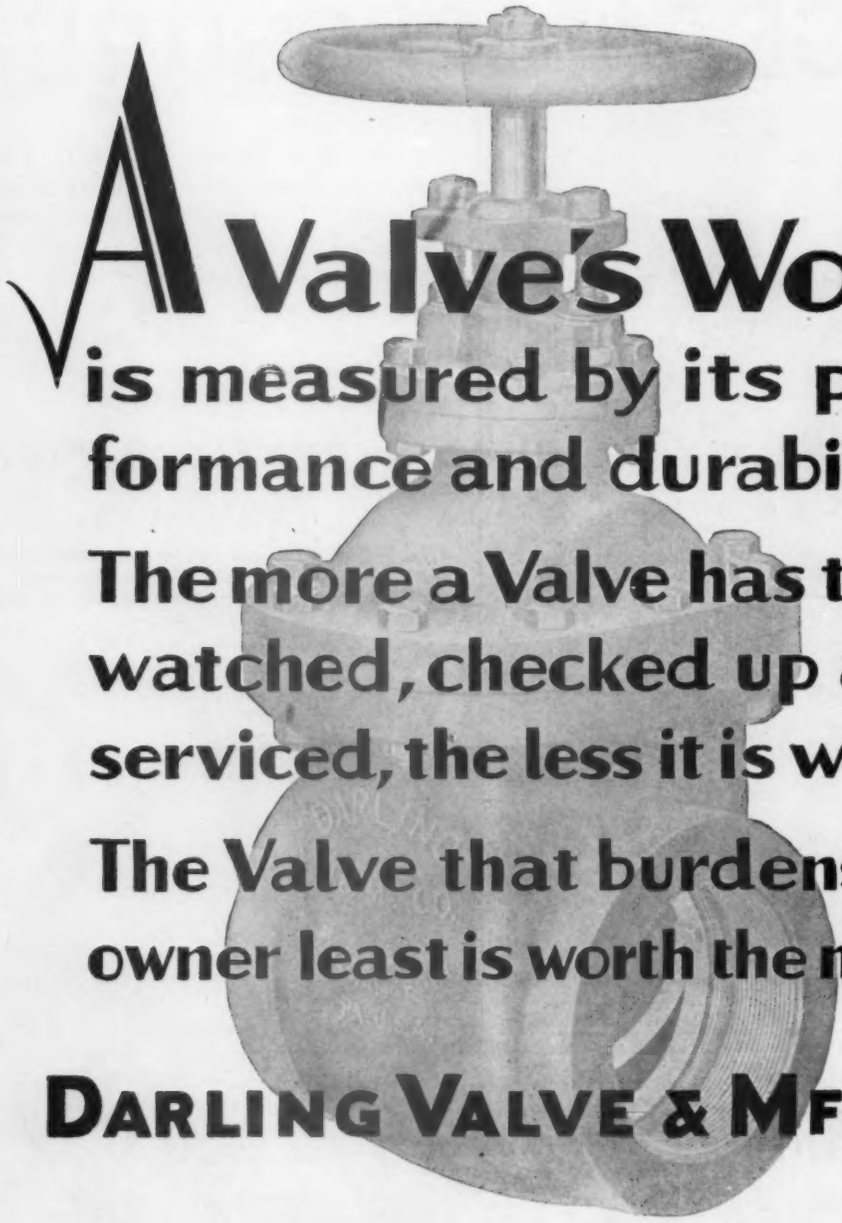
Call at Booth 225 at Atlantic City this month. See for yourself this superior, sand-cast, modern gas pipe. Full data and a cordial welcome awaits you!

McWANE CAST IRON PIPE CO. BIRMINGHAM ALABAMA



PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

208 S. La Salle Street, CHICAGO
149 W. 2nd South Street, SALT LAKE CITY
226 Continental Oil Bldg., DENVER
1006 Grand Avenue, KANSAS CITY
40 Exchange Place, NEW YORK
111 Sutter Street, SAN FRANCISCO
417 S. Hill Street, LOS ANGELES
611 Spalding Bldg., PORTLAND, ORE.
1807 Santa Fe Bldg., - - - DALLAS



A Valve's Worth

is measured by its performance and durability

The more a Valve has to be watched, checked up and serviced, the less it is worth

The Valve that burdens its owner least is worth the most

DARLING VALVE & MFG. CO.

Williamsport, Pa.

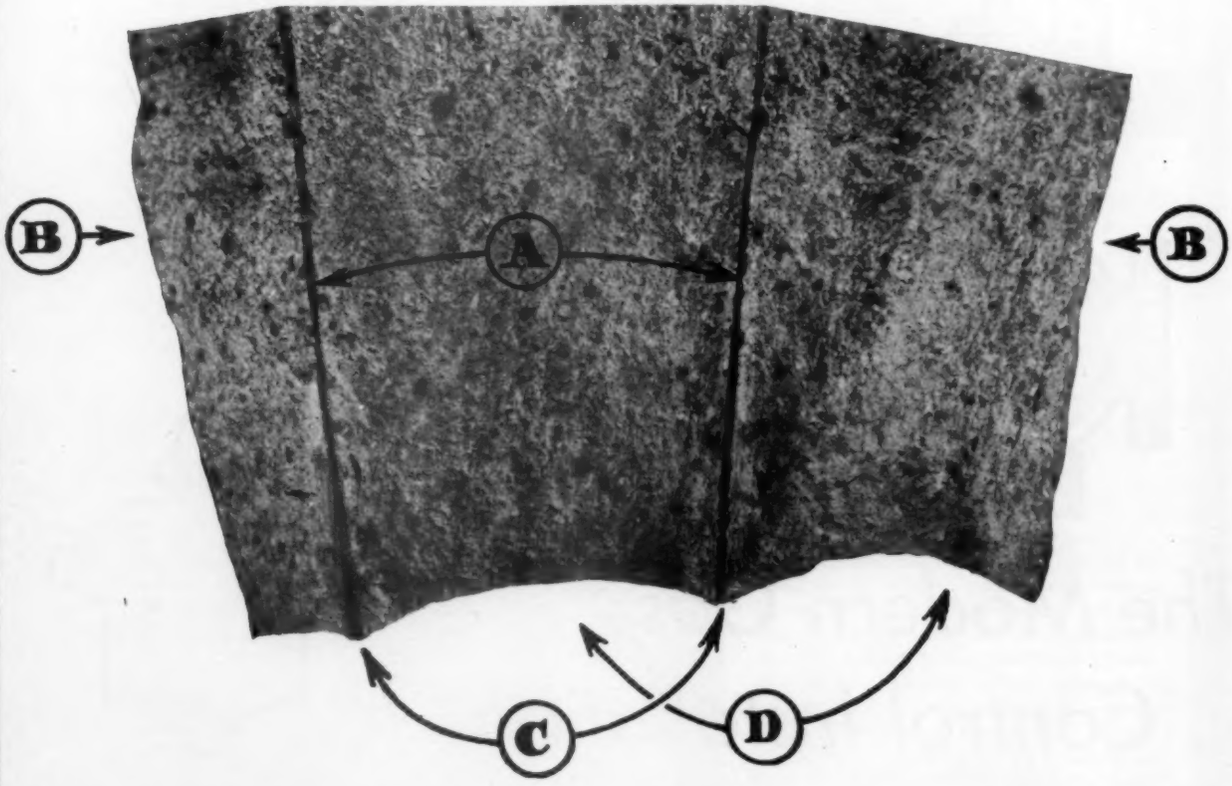
NEW YORK OKLAHOMA CITY HOUSTON

DARLING

GATE VALVES

How Are Your Arches Holding Up?

Compare the next ARCH that falls or is torn out, with section illustrated below—*this ARCH was laid in KROMEPATCH.*



A Thin even KROMEPATCH joints bond brick into a monolithic structure. Note absence of crumbling, fluxing, bubbling and squeezing out of KROMEPATCH.

B In tearing out this section, the brick broke while KROMEPATCH joints remained intact. The joints are stronger than the brick.

C KROMEPATCH protects brick by resisting destructive elements, preventing penetration at joints. Note how joints project, proving conclusively that KROMEPATCH is more resistant to abrasion and destruction than brick themselves.

D Brick wear back in centre (concave) while strong KROMEPATCH joints project, giving protection where it is most needed and thus increasing service life of arch.

REMEMBER:—Joint failure is caused by either crumbling or melting of bonding material.

Crumbling joints (material that lacks bond) allow heat to penetrate, exposing corners of brick which crack and fall out. This action repeats itself and soon joints are wide open and you need a new arch.

Joints made of clay base cements (lacking refractoriness) soften at low temperatures and flux sides of brick. Bonding material and fluxed brick bubbles from joint allowing heat to penetrate. Results—joints deeply cut out and short arch life.

KROMEPATCH Cement is primarily chrome ore—does not crumble, squeeze out or flux brick. Use it and avoid short ARCH and refractory lining life.

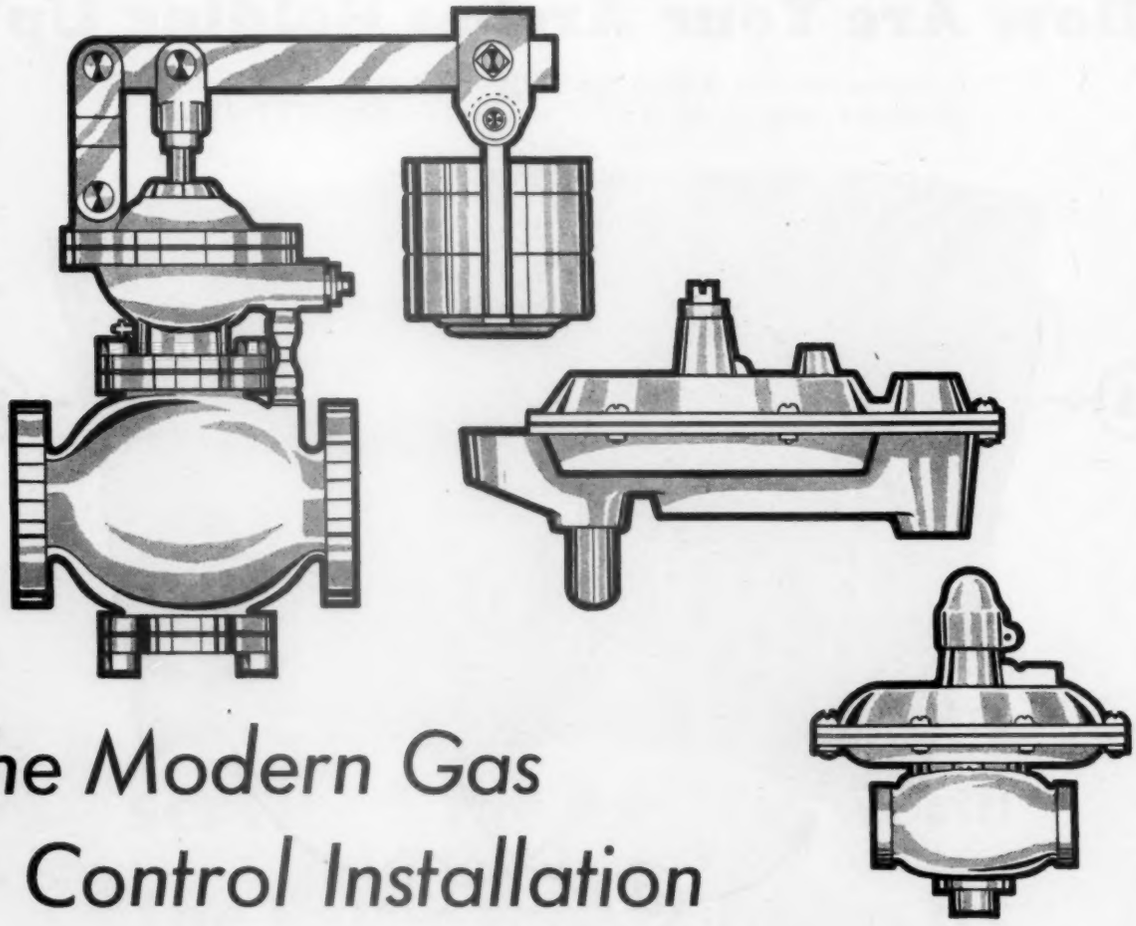
KROMEPATCH does prolong the service life of furnace linings.

Write for Bulletin 1-17-18

"Distributors in Principal Cities"

E. J. LAVINO AND COMPANY
REFRACTORIES DIVISION
CHROME, MAGNESITE AND SILICA REFRACTORIES
BULLITT BUILDING PHILADELPHIA

"Pioneers in Chrome Refractories"



The Modern Gas Control Installation

DEMANDS GAS CONTROL UNITS SUPER-SENSITIVE TO EACH PARTICULAR JOB

Rugged construction, accurate performance, and factory cooperation are three reasons why Reynolds Units are always on the specification sheet of every Gas Control job. When that next Gas Control installation comes up—let Reynolds go over your problems with you. Their engineering staff is especially trained to co-operate in working out and building up Gas Control Units that are: reasonably priced, efficient in operation, dependable day in and day out. Write us, our branch offices or our representatives for details.

RECOGNIZED GAS CONTROL SINCE 1892

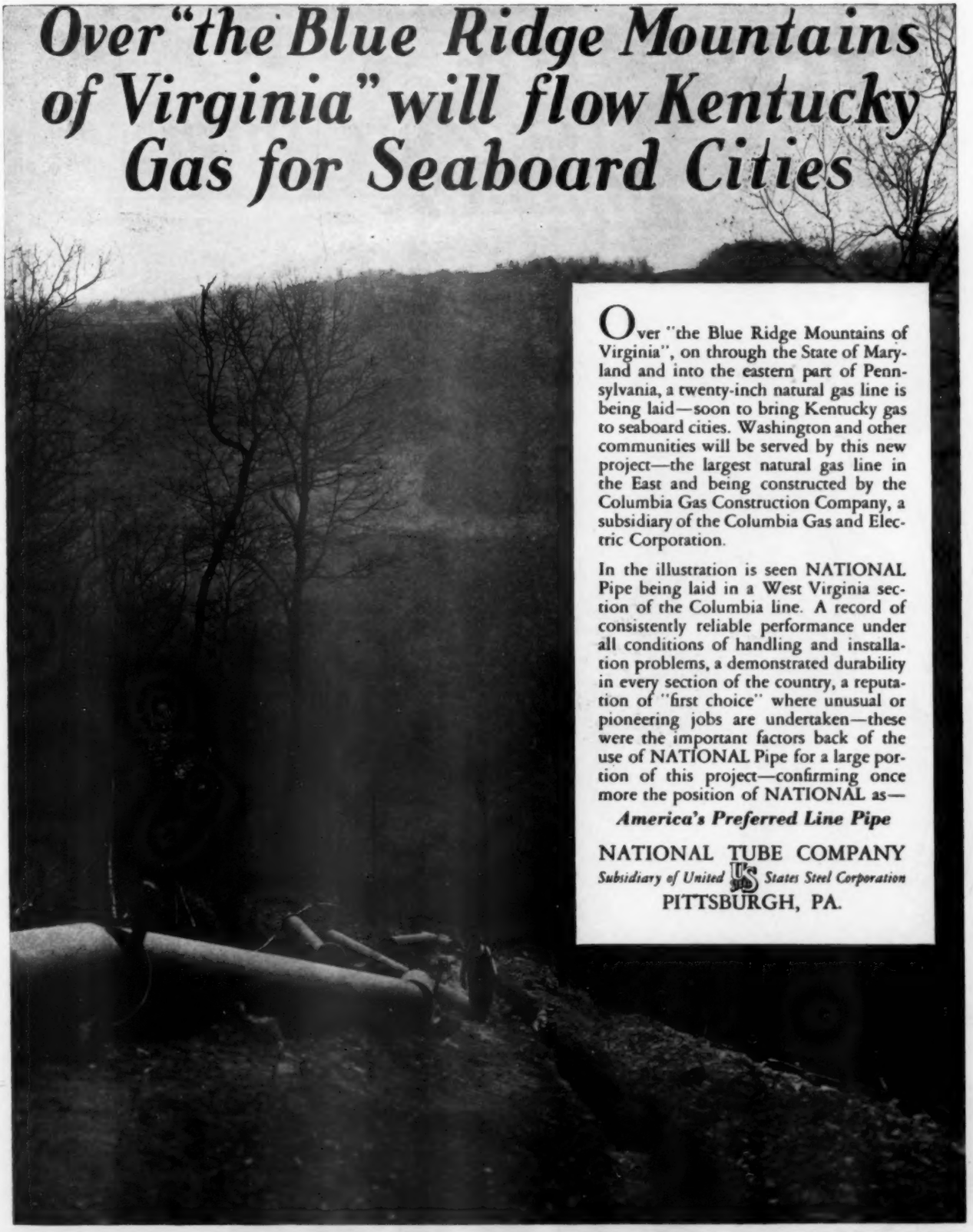
REYNOLDS GAS REGULATOR COMPANY

ANDERSON, INDIANA

BRANCH OFFICES { 422 DWIGHT BUILDING, KANSAS CITY, MISSOURI
2ND UNIT SANTA FE BUILDING, DALLAS, TEXAS

REPRESENTATIVES { EASTERN SERVICE CO., BOSTON, MASSACHUSETTS
F. E. NEWBERRY, AVON, NEW JERSEY

Over "the Blue Ridge Mountains of Virginia" will flow Kentucky Gas for Seaboard Cities



Over "the Blue Ridge Mountains of Virginia", on through the State of Maryland and into the eastern part of Pennsylvania, a twenty-inch natural gas line is being laid—soon to bring Kentucky gas to seaboard cities. Washington and other communities will be served by this new project—the largest natural gas line in the East and being constructed by the Columbia Gas Construction Company, a subsidiary of the Columbia Gas and Electric Corporation.

In the illustration is seen NATIONAL Pipe being laid in a West Virginia section of the Columbia line. A record of consistently reliable performance under all conditions of handling and installation problems, a demonstrated durability in every section of the country, a reputation of "first choice" where unusual or pioneering jobs are undertaken—these were the important factors back of the use of NATIONAL Pipe for a large portion of this project—confirming once more the position of NATIONAL as—

America's Preferred Line Pipe

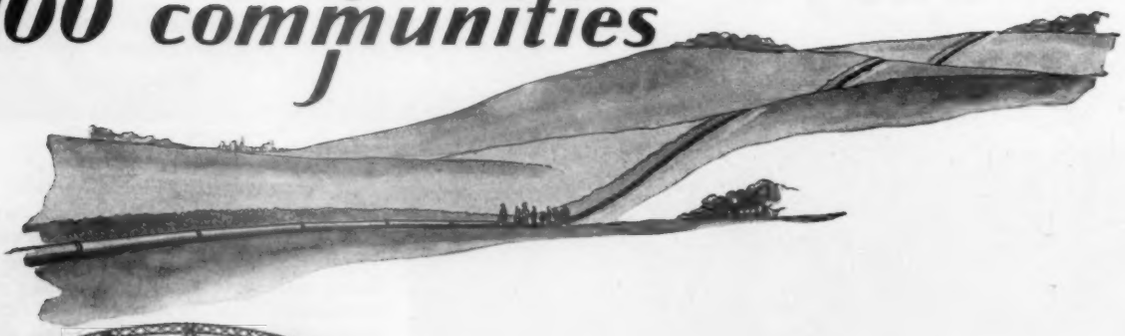
NATIONAL TUBE COMPANY

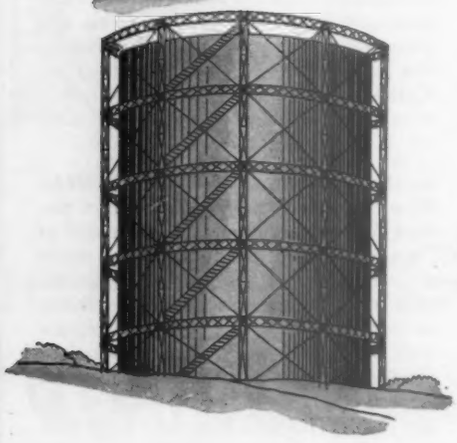
Subsidiary of United States Steel Corporation

PITTSBURGH, PA.

NATIONAL PIPE

Gas ~ for more than 100 communities





IN more than 100 progressive and prosperous Middle Western communities, the subsidiaries of North American Light & Power Company supply Gas—either natural or manufactured—for every industrial and domestic purpose.

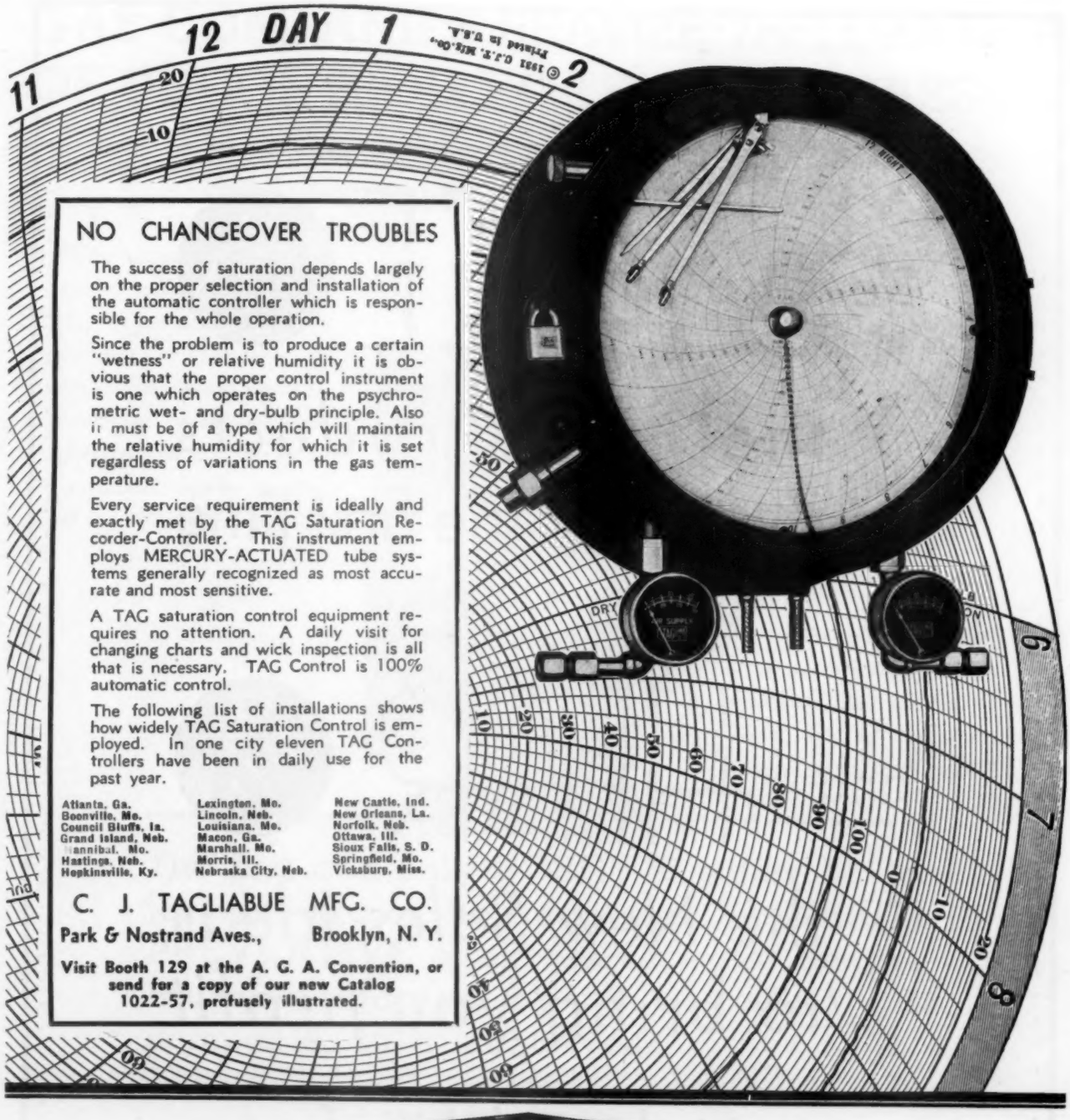
Forty-eight of these communities are located in Illinois; five each in Iowa and Missouri, and fifty-five in Kansas.

Through supplying this service—one of the most essential to our modern civilization—the Company while prospering itself is helping these communities to prosper. We, and they, recognize our mutual interest and mutual responsibility to work together for the benefit of both the Company and the Community served.

If it's done with heat, you can do it better with Gas

North American Light & Power Company

231 So. La Salle Street Chicago, Illinois



NO CHANGEOVER TROUBLES

The success of saturation depends largely on the proper selection and installation of the automatic controller which is responsible for the whole operation.

Since the problem is to produce a certain "wetness" or relative humidity it is obvious that the proper control instrument is one which operates on the psychrometric wet- and dry-bulb principle. Also it must be of a type which will maintain the relative humidity for which it is set regardless of variations in the gas temperature.

Every service requirement is ideally and exactly met by the TAG Saturation Recorder-Controller. This instrument employs MERCURY-ACTUATED tube systems generally recognized as most accurate and most sensitive.

A TAG saturation control equipment requires no attention. A daily visit for changing charts and wick inspection is all that is necessary. TAG Control is 100% automatic control.

The following list of installations shows how widely TAG Saturation Control is employed. In one city eleven TAG Controllers have been in daily use for the past year.

Atlanta, Ga.	Lexington, Mo.	New Castle, Ind.
Boonville, Mo.	Lincoln, Neb.	New Orleans, La.
Council Bluffs, Ia.	Louisiana, Mo.	Norfolk, Neb.
Grand Island, Neb.	Macon, Ga.	Ottawa, Ill.
Hannibal, Mo.	Marshall, Mo.	Sioux Falls, S. D.
Hastings, Neb.	Morris, Ill.	Springfield, Mo.
Hopkinsville, Ky.	Nebraska City, Neb.	Vicksburg, Miss.

C. J. TAGLIABUE MFG. CO.

Park & Nostrand Aves., Brooklyn, N. Y.

Visit Booth 129 at the A. G. A. Convention, or send for a copy of our new Catalog 1022-57, profusely illustrated.

TAG SATURATION CONTROL

Be sure to SEE

the *New Products*
shown for the first time

and HEAR

the *New Sales Ideas*
to bring *you profit*

At the Exhibit of

AMERICAN GAS PRODUCTS CORPORATION

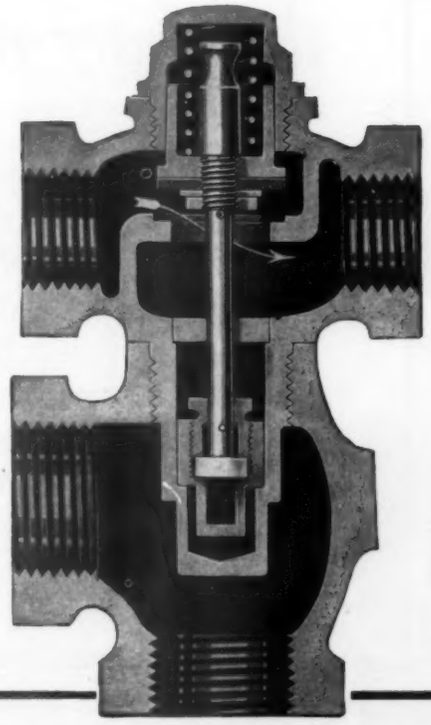
BOOTHS 527 - 528 - 529 - 530

A. G. A. CONVENTION
ATLANTIC CITY

GAS COMPANIES REALIZE THE DANGER OF UNCONTROLLED TEMPERATURES . . .

Note this Extract from WATER HEATING, 1930 Edition, pages 78 and 79, published by A.G.A.

"The most satisfactory type of valve now available for gas water heating systems . . . This form of temperature relief valve is deserving of widespread application wherever a gas water heater or an oil water heater is used."



"It performs the function of a satisfactory safeguard without the loss of water, and at the same time it conserves fuel."

The first and only POSITIVE safety device for gas water heaters—an ABSOLUTE PREVENTIVE of excessive water temperatures—adopted by 29 operating gas companies in a single year.

LOVEKIN

EMERGENCY GAS SHUT-OFF VALVE

See it at the A.G.A. Convention—Space 838—or write

KITSON COMPANY, Sole Manufacturers
261 North Broad Street, Philadelphia

☐ *Please send information on the* LOVEKIN VALVE
☐ *Please send a* LOVEKIN VALVE, *without cost, for test purposes*

Name_____
Address_____
Official Capacity_____

They have kept the FAITH *they have met the* TEST

Faith after trial is doubly fortified. Nothing could be more eloquent of the vital place occupied by the gas companies of our country than the manner in which these agencies of public service have met the situation confronting them and the nation during the past year.

They have kept their forces virtually intact. They have inaugurated and maintained large projects of construction and expansion for the territories which they serve. In many instances they have established new economies for the benefit of their customers.

This could not have been accomplished unless, first of all, there existed a general recognition that the services rendered by the gas companies were essential to the happiness and well-being of our people. Only second to this is the fact that the gas industry has enjoyed the advantages of a progressive leadership, as well as of an organization through which that leadership has found adequate expression and support.

In the immediate future, more than ever, it will be necessary to adhere firmly to the sound principles of cooperation within our ranks and to the high standards of public service which have earned the confidence which we enjoy today.

Consolidated Gas Company of New York

GEO. B. CORTELYOU, President

NEW ECONOMY

FROM STILL HIGHER EFFICIENCY OF BARBER CONVERSION BURNERS

CUSTOMERS of yours who are still heating their homes with coal, in spite of the work and dirt, can now lay aside the coal shovel and the ash basket and enjoy the modern comfort and satisfaction of gas heat.

BARBER Automatic Conversion Gas Burners provide the means. They are lowest in operating cost of any high grade automatic conversion burner—prices ranging from $72.50 up. They are easy to install. They fit any size or shape of furnace or boiler EXACTLY and they achieve an efficiency that compares favorably with custom-built gas fired heating Furnaces and Boilers.

This economical efficiency comes from the patented BARBER jet principle with its twin-flame reaching a higher temperature than any mixer-type burner; and the BARBER method of properly applying the heat directly to heating surfaces.

See Demonstrations at
A. G. A. Convention
Atlantic City, N. J.
Booth No. 311

You can increase your "load" materially this winter by selling BARBER Burners to hundreds of medium size homes in your city that need only BARBER to convert them. Write for our complete sales plan.

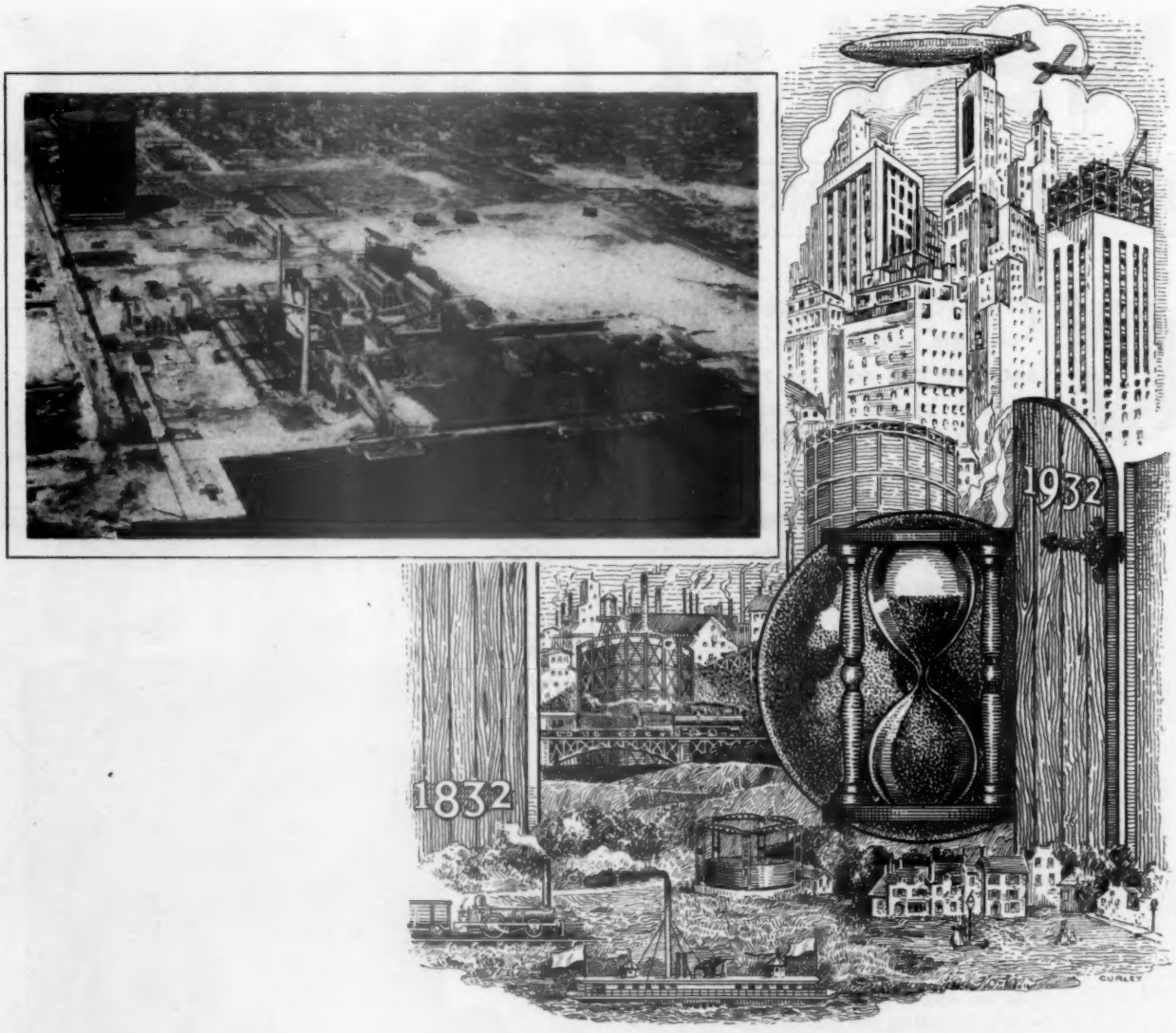
BARBER Special Burner Assembly for rectangular boiler made up of 6 No. U-17 units, Minneapolis Motor Gas Valve, automatic and fully equipped.

For furnace or boiler, whether round, square or rectangular, BARBER Gas Burners are made to fit it perfectly and are placed to attain the utmost efficiency. The illustration shows 4 No. U-25 BARBER Burner units and complete automatic equipment.

BARBER *Automatic* JET GAS BURNERS

THE BARBER GAS BURNER CO.

3702-04 SUPERIOR AVENUE
CLEVELAND, OHIO



Nearly 100 years of wide experience in engineering, designing and erecting are available to you, through the Bartlett Hayward Co., if you are planning the re-habilitation of your existing equipment or the installation of extensions.

Recommendations and designs are based on a thorough and complete practical analyses of your requirements from a broad operating and economic viewpoint.

BOOTH 604

THE BARTLETT HAYWARD COMPANY

BALTIMORE **MARYLAND**

Coal Gas, Carburetted Water Gas, Blue Water Gas, By-Product Plants—DeBrouwer Charging and Discharging Machines—Waste Heat Boilers—Purifiers—Condensers—Tar Extractors—Thickening and Filtering Equipment—Feld Scrubbers—Fast's Couplings—Tanks—Gas Holders

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Manufactured and Natural Gas·

HENRY M. RILEY, *Editor*

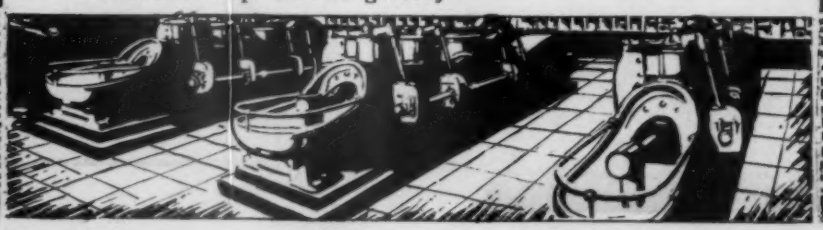
The Check-Up

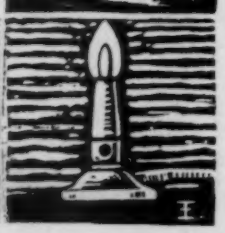
AS AMERICAN GAS ASSOCIATION convenes for its thirteenth annual meeting it might well be asked what the gas industry is doing to stem the tide of adverse business. Have we indulged in an orgy of discharging employees? *Obviously not.* Is our publicity and advertising being prosecuted in a healthy fashion? *Yes.* Are we planning for the future by way of research? *Very actively.* These items being disposed of, there remain two which are worthy of some little discussion. We refer to the status of our business as regards the number of customers and volume output, and the purchases of equipment and materials for properly conducting our vast industry.

Latest figures from American Gas Association show approximately an increase in customers of one tenth of one percent and seven tenths of one percent for manufactured and natural gas respectively, and a decrease of one and eight tenths percent and eight and nine tenths percent in output for the selfsame gases. Much of this decrease in gas sales is chargeable to a decline in industrial sales, which is to be expected. However, we have not only retained our previous number of customers but have increased them slightly.

Relative to our purchases of equipment and supplies it is of interest to note that American Gas Journal has recently conducted an investigation and the results seem to strongly indicate, that as an average proposition, we have bought goods and supplies this year almost on a par with 1930.

The check-up isn't so gloomy.

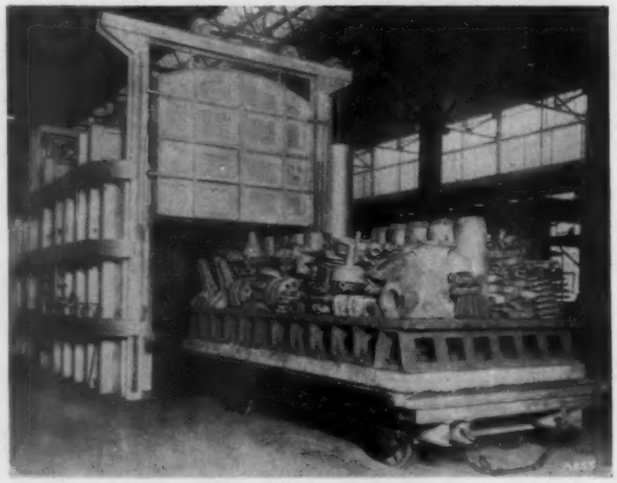




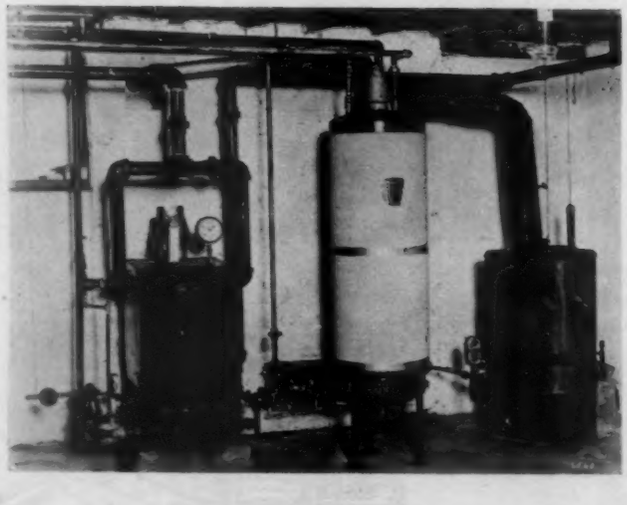
OCT 15 1931

What Happens at the Burner Is What Determines Our Success

This car hearth furnace in a plant in Toledo is used for heat treating special castings. It has a capacity of twelve tons and has automatic temperature controls.

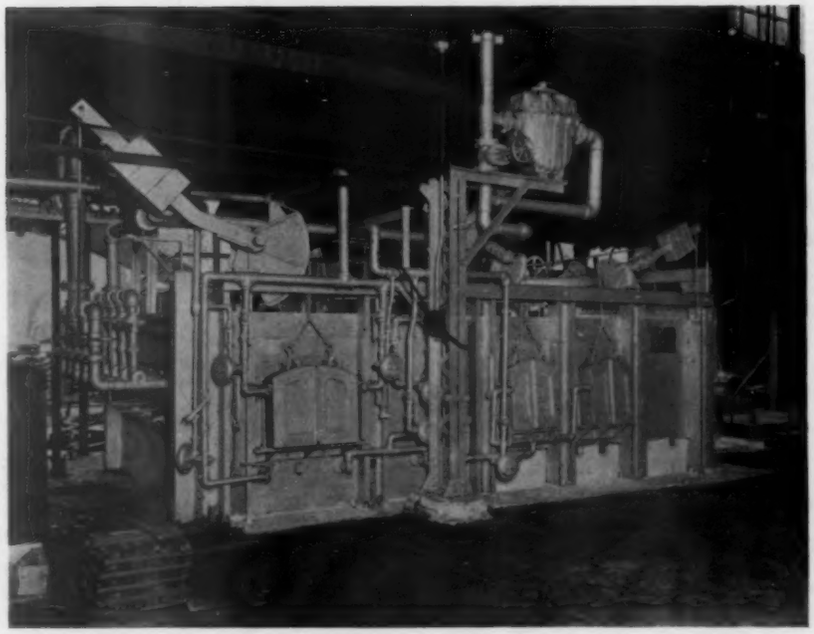


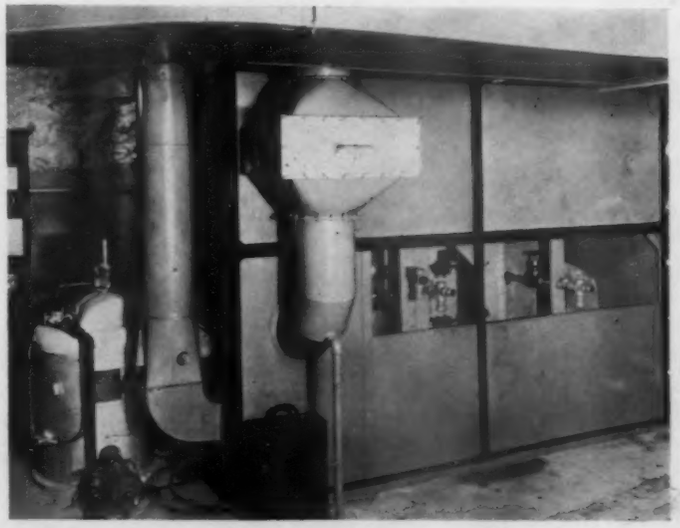
Left—A fine installation of gas fired laundry appliances in a Chicago home. Lower Right—In another Chicago home the customer is enjoying the benefits of incineration, house heating and automatic hot water—all fired by gas.
Lower Left—This large casting was made in a Chicago plant; the core was baked in a gas fired core oven.



This furnace, located in a Jackson, Michigan, plant, is used for hardening automobile fans. It operates at 1500 deg. F, turning out 200 pounds per hour with a consumption of 133,560 Btu.

The billet heating furnace shown is located in one of Pittsburgh's steel works. It is divided into two heat zones wherein predetermined temperatures are maintained automatically. The atmosphere is also automatically controlled. It may be operated at either 1450 or 2100 deg. F. Operating between 1900 and 2100 deg. F, the furnace will heat 4400 pounds of billets per hour with a natural gas consumption of 5100 cubic feet.



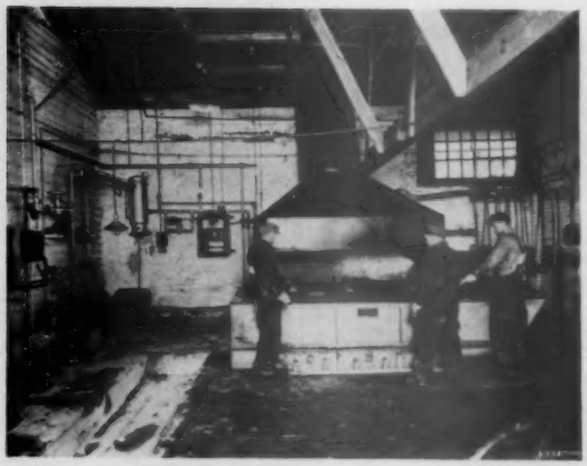


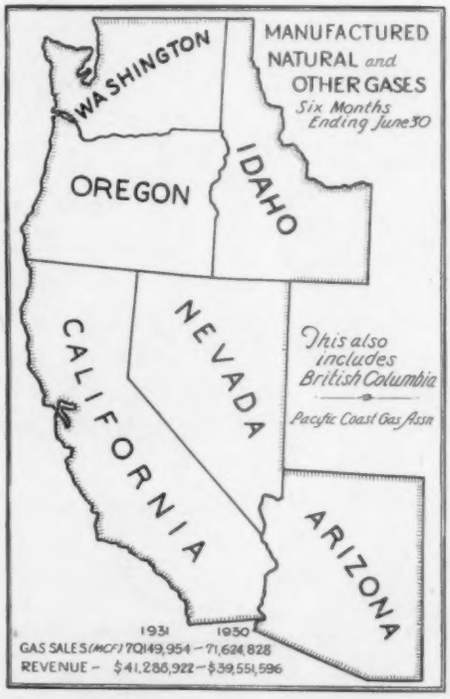
Here is shown the gel unit of the air conditioning system which operated throughout the past summer in a home at Pelham, Westchester County, New York. Part of the covering has been removed to install thermometer wells. The gas furnace used in activating the gel is at the right hand end of the unit. This is one of three home air conditioning installations which have been sponsored by American Gas Association.

Upper Right—This gas fired boiler installation in Baltimore has made it possible for the owner to exercise his hobby by way of showing amateur movies.

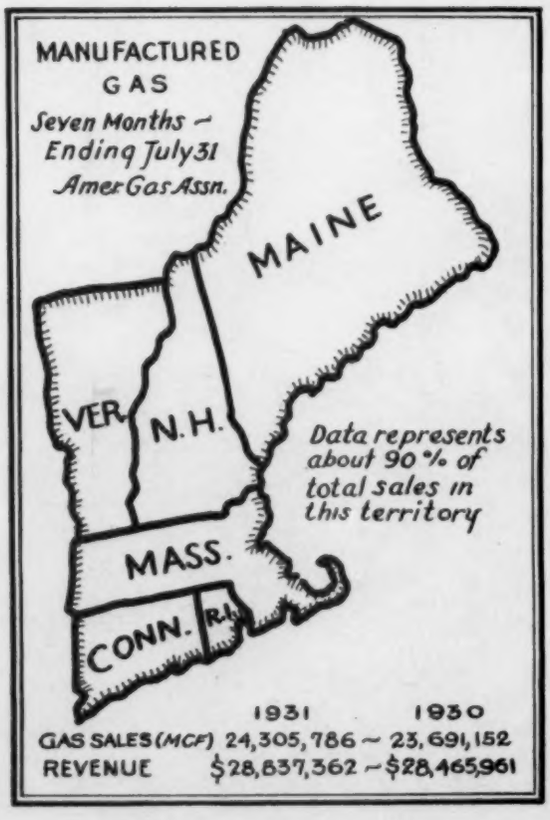
Right—This furnace for heat treating steel castings, located in St. Louis, beat out an electric furnace at a low rate, per KWH. It operates on 600 Btu gas with a consumption of 750M per month.

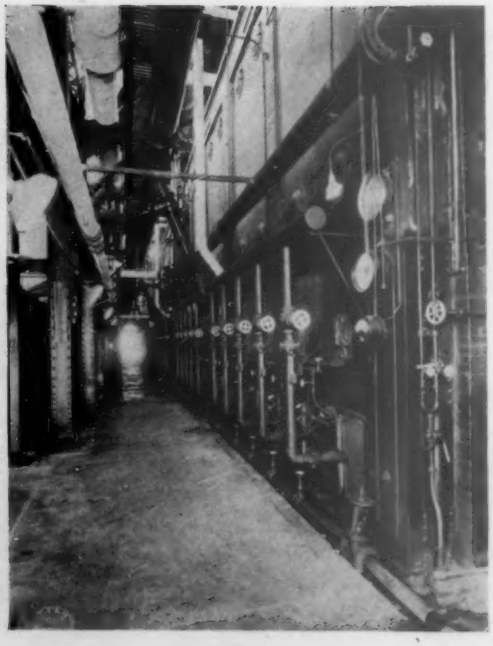
Below—Galvanizing furnace in St. Paul. Capacity 8000 pounds of work in ten hours with a gas consumption of 6200 cubic feet.



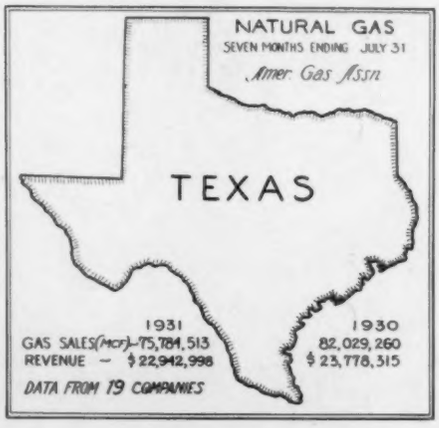


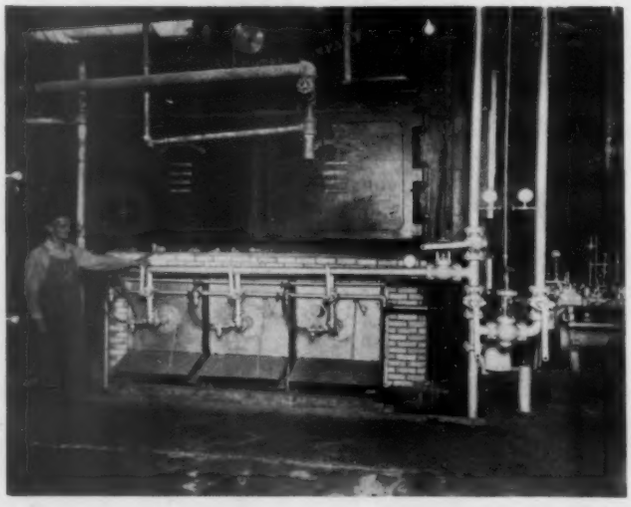
Upper Right—A gas fired boiler automatically keeps a solution of wax at the right temperature for spraying oranges in California. The wax coating has virtually eliminated wastage due to Blue Mold.
Right—Sample of kitchen in Los Angeles and vicinity where 140,000 homes are equipped with gas ranges.
Below—A satisfied housewife preparing a meal with the help of Butane.

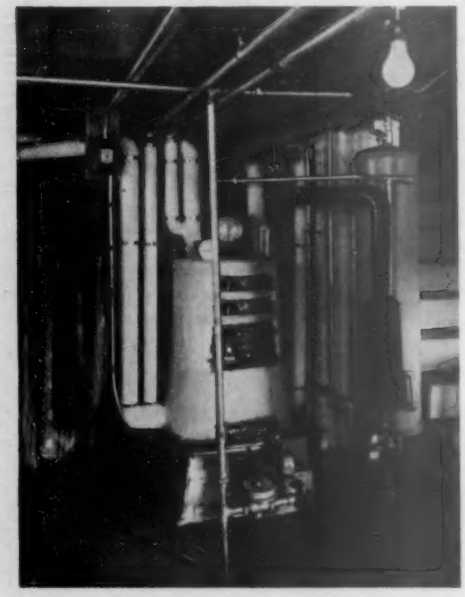




Left — Battery of twelve boilers fired with natural gas for use at a sulphur plant in Texas. Consumption 14,000M per 24 hours.







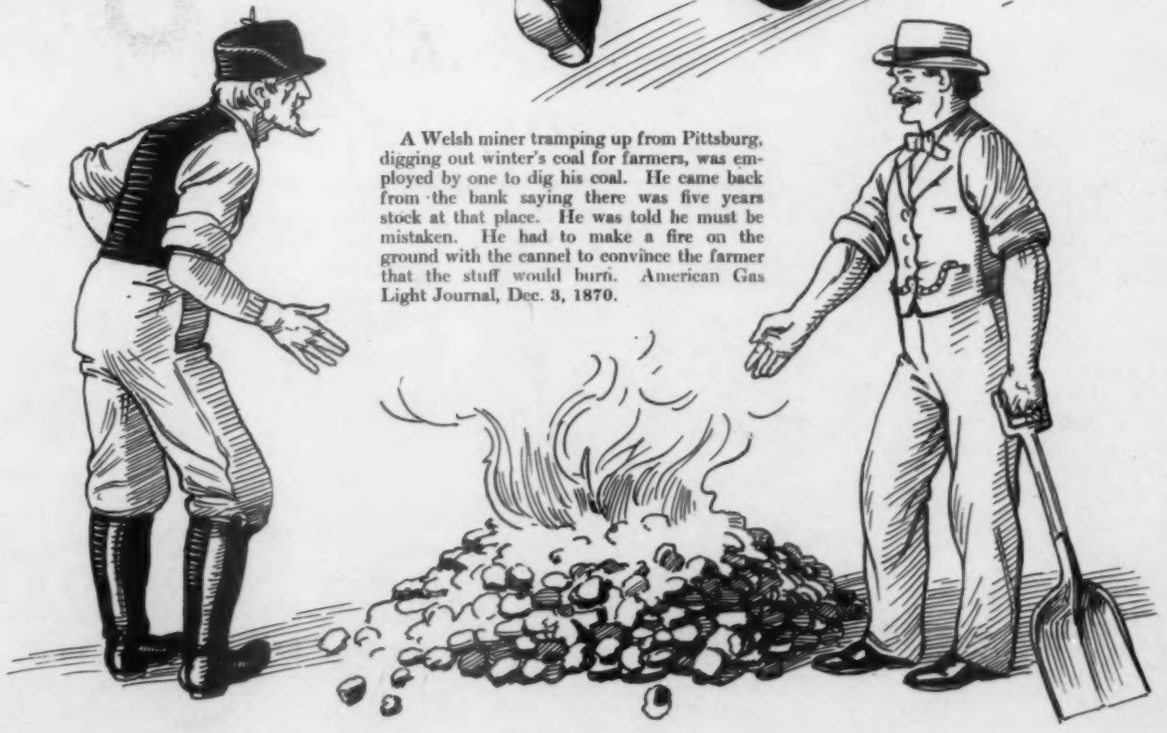
Above—Boilers in St. Charles Hotel, New Orleans using 26M cubic feet of natural gas per hour.
Left—A Memphis househeating furnace of the converted type. 25% of the Memphis homes are heated with natural gas.
Below—"East, West, Hame's Best." A gas Coalfire in a fine New Jersey home.

Can You REMEMBER When-?

by E. Eisfeller

One of the workmen while defending himself from the attack of a dog, killed him. As the animal was highly prized trouble was anticipated and it was decided to put the carcass in a retort and make gas of it. The result was that when the charge or dog was drawn, nearly all the carbon came with it, leaving the retort nearly as clean as new. The gas at the test burner was much improved. American Gas Light Journal, July 2, 1870.

In Newark a short time ago Mr. Blon, liquor dealer, introduced an apparatus which purported to effect a great saving in gas. It exploded with terrific effect, demolishing $1000 worth of choice wines, champagnes and liquors. Even furniture, mirrors and appointments of Nicholas Weld, barber in the basement, were shattered by the shock. American Gas Light Journal, Sept. 16, 1870.



A Welsh miner tramping up from Pittsburg, digging out winter's coal for farmers, was employed by one to dig his coal. He came back from the bank saying there was five years stock at that place. He was told he must be mistaken. He had to make a fire on the ground with the cannel to convince the farmer that the stuff would burn. American Gas Light Journal, Dec. 3, 1870.

A Stabilizing Influence

Clifford E. Paige
President,
American Gas Association

THE Gas Industry once again establishes its stability and strength. Our business, in common with all public utilities, dealing in necessities, maintains a reasonable proportion of normal sales, even when other businesses, particularly those dealing in luxuries, feel the effects of disturbance and depression.

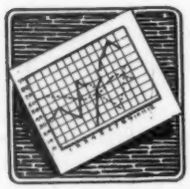
The very soundness of the gas company is a contribution to the community and, in bad times, goes a long way towards stabilizing all the business in the territory it serves.

Moreover, under most circumstances, continuity of employment is assured, which does much to allay the uneasiness of its employees in regard to prospective unemployment.

The product of a gas company has long since ceased to be considered a luxury, and by reason of its necessity to the gas consuming public, its business takes on a permanence and certainty not otherwise possible.

During the past months, the industrial business of the gas companies has slowed up, unquestionably. In many cases, however, the domestic business has gone a long way toward making up for this loss.

The industrial business will return as business improves, as it already shows signs of doing. Meanwhile, gas companies are preparing themselves for a still greater range of service and a still greater development in their operations.



Load Factor and Its Bearing Upon Gas Distribution Investment

GEORGE WEHRLE,

Superintendent Gas Department, Public Service Company of Colorado, Denver

IF it were possible for the ordinary domestic user of gas to so regulate his requirements that gas would be continuously taken at a uniform rate, this service could be supplied through a ¼-inch service pipe while the distribution mains amply supplying a number of such customers would be ridiculously small as compared with those in common use today. Such a Utopian situation represents a 100% load factor upon a gas distribution system entailing a minimum investment for the facilities required to render service, and while gas engineers may never see this condition actually attained, they will always be commended for their efforts expended toward this goal.

When it is considered that a gas distribution system in the ordinary city is not designed primarily to handle the annual load, or even the daily load, but is designed with the principal object in view of supplying the required amount of gas at adequate pressure for a five-minute period which may occur only once or twice in a year, it is readily seen that load factor is the most important thing with which the distribution engineer has to deal. The investment in equipment which is idle over the major portion of the time is tremendous and represents readiness-to-serve costs that should be written into gas rates applying since they are as much a part of the cost of service as the gas that is actually used.

Evolution of Load Factor Consciousness

A generation ago, the use of gas was confined almost exclusively to illumination. Most all of the gas was used over the same period of the day. This condition was accepted as characteristic of the gas business and therefore irrevocable, and while gas engineers of that time may have known about load factor, there was nothing they could do about it and it was seldom heard in their conversation or seen in their writings. The load followed the annual solstice chart of daylight and darkness and the peak of the load and the majority of annual use occurred in the winter-time. Then came the use of gas for cooking purposes and it was discovered that this additional load could be handled through the same mains and service pipes with no additional investment simply because the load factor had been improved. While the peak of the illuminating load came at night and in winter, the peak of the cooking load was usually at noon and in summer. Then another strange thing was discovered. It was found that more and more customers could be supplied through the same mains for the simple reason that in an average group there were those who cooked their meals at slightly different times and thus the benefit of diversity in the use of gas became known. Load factor and diversity became terms in common use in the gas business and of greater importance as the industry grew and uses for gas increased.

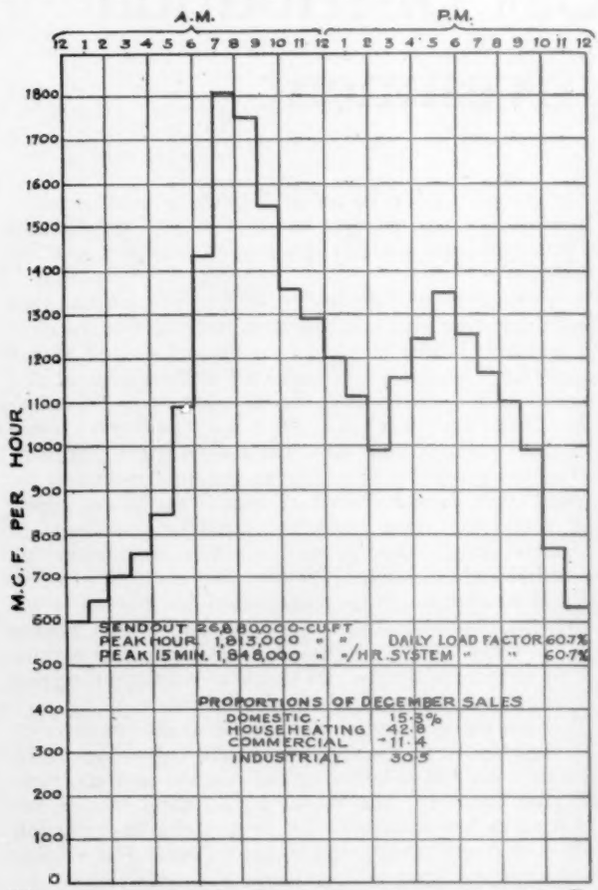
As we continue in the history of gas use, we find that the illuminating load was almost entirely lost to the electric industry which resulted again in a low load factor business due to the reduction of the offsetting night and winter load which had been used for illumination. The progress of the gas business since that time is familiar to all. The use of gas in industry and in space heating has brought about a revolution requiring that actual monetary value be placed upon load factor and diversity which must be considered in the rates charged and in the allowable investment for the individual customer. We find that the cost of service is somewhat inversely proportional to the load factor which the customer places upon our distribution system and the rates which we charge for a particular service should vary accordingly. In this way only can the price of gas be made competitive with other fuels.

It is not the purpose of this article to discuss rates or rate structures but the subject of load factor cannot be discussed without mentioning the relation between rates and load factors. The theory of an ideal rate is one which takes into consideration, first, a charge applicable to each customer alike, regardless of demand or volume of gas consumed; second, a charge per cubic foot of demand required; and, third, the cost of the commodity delivered. Let us assume that the first, or customer charge, is $9.00 per year; that the second, or demand charge, is 32 cents per cubic foot of hourly demand per year; and that the third, or commodity charge is 40 cents per M cubic feet of gas consumed. Assuming that a customer has a demand of 60 cubic feet per hour and his annual demand load factor is 33⅓%, which means that he uses gas for 8 hours per day, his average rate is $0.56 per M cubic feet. If he increases his use to 12 hours per day and thereby has a 50% demand load factor, his average rate becomes $0.508 per M cubic feet. If he uses gas continuously and thereby has a 100% load factor, the average rate is $0.455 per M cubic feet which is the lowest rate that could be earned with a 60-cubic foot demand. On the other hand, if he used only 2500 cubic feet per month, which is 5.7% load factor, the rate would be $1.34 per M cubic feet. These illustrations give some idea of the monetary value of load factor in rate making.

How Diversity and Load Factors Help

A definite value may be placed upon each class of load and upon the load characteristic of each type of appliance. Regardless of how poor the load factor may be upon a particular class of business or type of appliance, it is possible for the taking on of such business to add to the overall profit of the company through the benefit of diversity and the improvement of load factor

if the effect of offsetting loads is carefully watched. This can be done only through perfect cooperation and coordination between operators and salesmen and these two departments must enjoy the closest relations if profit is to accrue to the gas business.



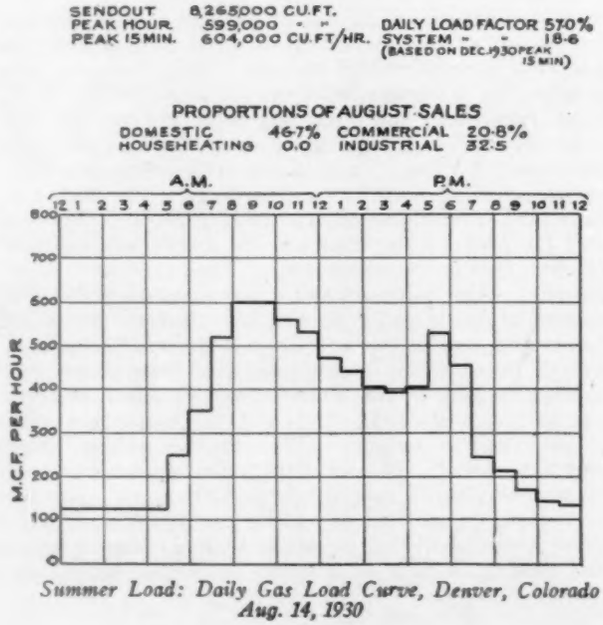
Winter Load: Daily Gas Load Curve, Denver, Colorado, Dec. 19, 1930

The domestic customer has been the back-bone and mainstay of the gas business up to this time. It will perhaps always represent the base load of the gas business and the factor influencing distribution investment to the greatest extent, yet it may not be the most profitable gas load. The ordinary domestic customer uses gas to cook food, to heat water, to launder clothes, and for auxiliary space heating. In recent years, he is supplementing this use with house heating and refrigeration. It is within the realms of possibility that he may soon use gas to cool his house in summer. The load factor placed upon the distribution system by the household user has been very low but is now materially improved by the diversity of uses for gas in the home. As noted in the foregoing, a customer whose demand is 60 cubic feet per hour and who uses an average for cooking and water heating of 30,000 cubic feet per year has an annual demand load factor of 5.7%. If all of these domestic customers used gas at the same time, the distribution system would need to be designed to handle nearly twenty times as much gas during peak loads as the average requirement over the yearly period, but since there is a normal diversity among this class of gas users of three to one, the distribution system need only be designed of a capacity about seven times the average annual demand requirement.

To the cooking and water-heating load may be added a gas refrigerator, thereby increasing the annual consumption to 44,000 cubic feet without increasing the demand appreciably. The annual demand load factor now becomes 8.4% and assuming that the diversity among users remains three to one, the system load factor becomes 25% and the distribution system is only four times larger than it would need to be to handle the average annual demand requirement. If these same customers use house heating, the annual consumption is increased to 360,000 cubic feet whereas the hourly demand is increased to 200 cubic feet and the annual demand load factor becomes 21%. The diversity factor for house heating is practically nil since all customers will heat in the early morning hours at the same time. The combined load may be assumed to have a diversity of 1.25% and the system load factor will then be 26.25% which is about the height of expectations for domestic customers under present conditions. When we sum up this preamble it means that if we have obtained about all the load possible from our domestic customers the distribution system will still be operating at only about one-quarter of its possible annual capacity despite the fact that we have increased the demand load factor of the average customer from 5.7% to 21.0%, or about three and one-half times.

Effect of Type of Appliance on Load Factor

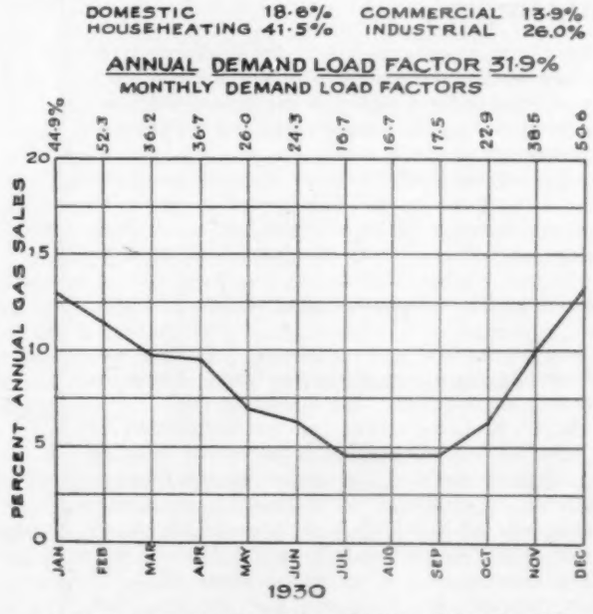
The gas furnace, automatic water heater, range, and refrigerator have values as load-building appliances in the order named. As profit-making appliances per unit of gas consumed the order may be changed and the profitability of one appliance become dependent upon another in proportion to the improvement of load factor. While the loads of the range and water heater are now considered to be of year-around variety, those of the refrigerator and gas furnace are in a measure offsetting to each other which adds to their relative value as desirable load-building appliances. Anything or any kind of appliance which tends to spread the use of gas over the year without increasing the hourly demand proportionately is desirable business. A customer using a range and gas furnace is the best possible prospect for a refrigerator and water heater because the cost of the additional gas service for the latter appliances is simply that of the actual gas consumed.



Summer Load: Daily Gas Load Curve, Denver, Colorado Aug. 14, 1930

While the annual load factor of gas customers has a direct bearing upon the design and cost of the distribution system, it is the hourly and daily load factor which is usually most seriously considered. The average domestic customer with a demand of 60 cubic feet per hour seldom has a daily use exceeding 100 cubic feet. When that is the case, the daily load factor is about 7%, representing 1⅔ hours' use of the demand. The house-heating customer with an hourly demand of 200 cubic feet may on the coldest day of the year use this demand for 20 hours in northern latitudes, thus giving a daily demand load factor of 83⅓%. The former domestic load will usually have a diversity of three to one while the house-heating load seldom exceeds one and one-quarter to one.

Two types of gas appliances may perform substantially the same work for the customer but with vastly different effect and consequent cost to the gas company. The water heater of high demand delivers the water-heating requirements of the family by heating the water instantaneously as required. The storage-type heater of low demand performs the same service at substantially the same cost to the customer but at a much lower cost to the gas company through the improvement of load factor. There can be no argument regarding the justice of penalizing the former type of appliance and premiumizing the latter in the rates charged to the customer. An understanding of this difference is essential in the education of the appliance salesmen since both types of appliance have equal values for load-building purposes. We have often been asked, "Why do you discourage the use of instantaneous water heaters on account of the effect upon the distribution system of the suddenly applied high demand and encourage the use of gas house-heating furnaces of the same demand and the same snap action?" The answer is load factor. The water heater is seldom used in total more than a small fraction of an hour per day while the gas furnace is frequently used from twelve to twenty hours per day.

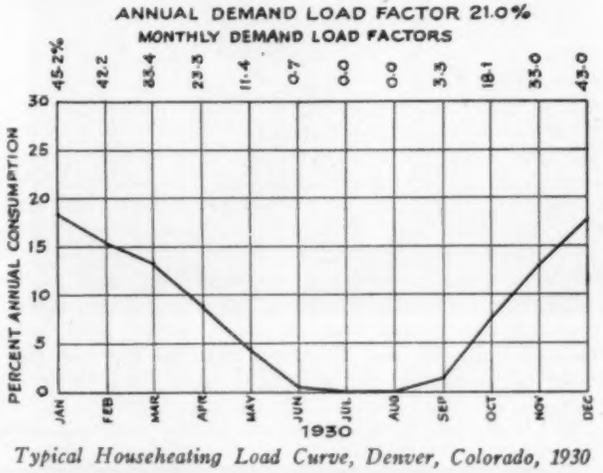

DOMESTIC 18·6%
HOUSEHEATING 41·5%
COMMERCIAL 13·9%
INDUSTRIAL 26.0%
ANNUAL DEMAND LOAD FACTOR 31·9%
MONTHLY DEMAND LOAD FACTORS
44·9% 52·3 36·2 36·7 26·0 24·3 16·7 16·7 17·5 22·9 38·5 50·6
PERCENT ANNUAL GAS SALES
0 5 10 15 20
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
1930

Load of Domestic Gas Sales, Denver, Colorado, 1930

Both require the same distribution investment while the gas consumption of the furnace over the annual period is many times that of the water heater. We can, therefore, afford to build the distribution system to withstand the sudden high demands of house-heating furnaces but we cannot afford to make the same investment for the instantaneous water-heating load of an ordinary customer. In the selection of load-building appliances in either the domestic, commercial, or industrial fields, this difference must be kept in view always.

Improvement in Total Load Factor

After the best load factor possible is obtained from the domestic customers, thus forming the base load of the gas business, a considerable improvement in the total load factor may be made by the judicious selection of commercial and industrial loads, particularly the latter. Since the present domestic load is composed of more and more house-heating gas sales, an offsetting commercial and industrial load should favor summer water heating in office buildings, hotels, and apartments, and brick and tile burning, which is usually a summer business. Other classes of business may be selected which are offsetting to each other as to seasonal use.


ANNUAL DEMAND LOAD FACTOR 21.0%
MONTHLY DEMAND LOAD FACTORS
45·2% 42.2 33·4 23·3 11·4 0·7 0.0 0.0 3.3 18·1 35·0 43·0
PERCENT ANNUAL CONSUMPTION
0 5 10 15 20 25 30
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
1930

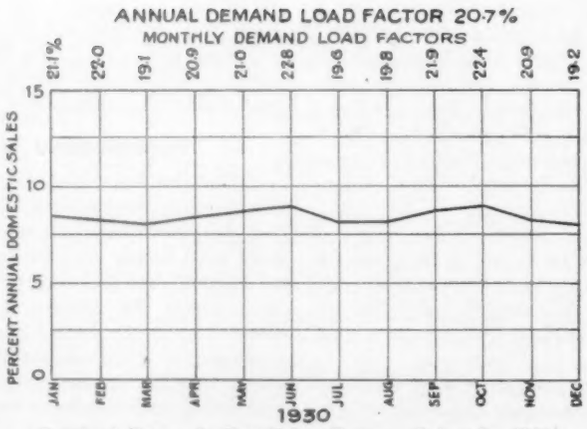
Typical Househeating Load Curve, Denver, Colorado, 1930

Diversity, and consequent load factor, is of utmost importance in the sale of industrial gas since this load on account of its magnitude and competitive character must be sold at relatively low rates and small profit and with a minimum investment.

While the subject covered in this article has been discussed chiefly from the viewpoint of the distribution engineer, it is highly important that the bearing of load factor upon the natural gas pipe line be given some mention. Today, there are a number of large pipe lines transporting natural gas several hundred to as much as a thousand miles distant from the fields to markets. These lines represent tremendous investments and obviously must be loaded to capacity at all times if capital charges are to be returned to the owners. This can best be done through the loading of these lines with properly diversified industrial sales superimposed upon the usual domestic base load. To the extent that this is done may depend the success or failure of the enterprise. The natural gas engineer is not so much interested in hourly load factor as the distribution engineer may be since the pipe line at high pressures contains capacity or "pack" to carry over hourly peaks that might disturb the distribution man's tranquility. It is customary, therefore, for the former to rate his pipe line in terms of daily capacity while the latter depends upon the hourly capacity of the city distribution system to give service. Both, however, are affected by annual load factor, as it may apply to their investment and profit, in the same degree.

Since a great many gas companies have recently changed from manufactured to natural gas, and many

more are contemplating this change shortly, it may be of interest to record the experience of Denver where natural gas has been in use a little over three years, and to note the effect upon distribution facilities occasioned by the change in load conditions. No doubt, a great deal of conjecture prevails as to the effect of house-heating loads upon existing distribution systems and a great deal of anticipated worry may be only borrowed trouble when actual experience is at hand.


ANNUAL DEMAND LOAD FACTOR 20.7%
MONTHLY DEMAND LOAD FACTORS
21.1% 22.0 19.1 20.9 21.0 22.8 19.6 19.8 21.9 22.4 20.9 19.2
PERCENT ANNUAL DOMESTIC SALES
15
10
5
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
1930

Load of Domestic Gas Sales, Denver, Colorado, 1930

In 1927, which was the last calendar year of manufactured gas use in Denver, total sales were 3,250,000 M cubic feet, whereas the peak hour was 1150 M cubic feet. This gave an annual demand load factor of 32.3%. The load comprised 58.5% domestic sales, 8.5% house-heating sales, and 33.0% commercial sales. There was no industrial gas sold. In 1930, which was the second calendar year of natural gas use, total sales were 5,000,000 M cubic feet and the peak hour was 1800 M cubic feet. The annual demand load factor was therefore 31.9%. This load was composed of 18.6% domestic sales, 41.5% house-heating sales, 13.9% commercial sales, and 26.0% industrial sales. It is seen that although proportions of the classified sales have changed radically, the increased load has been so perfectly balanced that the annual demand load factor is practically unchanged. This means that the distribution system has not been subjected to any generally different load condition than before and the required capacity increase is theoretically equal to the increase in total load.

The house-heating load will follow almost directly the degree-day curve for any particular city and the load factor will therefore vary in different cities directly as the degree-day curve. In Denver, where the average degree-days per year are 5880, the annual demand load factor for house heating is approximately 21%, or 26.25% when diversity factor is considered.

Too much emphasis cannot be placed upon the importance of controlling the demand of customers' appliances. Since proper load factor and consequent profit can accrue only from minimum demands and their maximum hourly use, watchfulness on the part of the salesman and the operator is imperative. Theoretically, a properly designed demand charge in rates and the universal use of demand-limiting meters would solve this part of the problem of selling and distributing gas perfectly. Anything which will increase gas sales without increasing demands upon the distribution system proportionately is an improvement of load factor and consequently is profitable business.

'Ray for Montgomery!

NO ill effects of business depression during the past year have been felt by the Alabama Utilities Service Company of Montgomery, according to announcement by W. F. Eve, Jr., manager, in a statement showing detailed information relating to the company's expansion and business volume. To meet demands the company has spent during the past year $250,000 in extensions and improvements and has added 400 new customers.

In the merchandising of gas burning equipment, August was the best month since the company began operations in Montgomery on May 1, 1929. During that month 121 kitchen ranges were sold, of which 77 went to new customers who had never used gas before. Since January 1 three carloads of gas ranges, two carloads of water heaters and one carload of space heaters were sold in the city.

A summary prepared by Mr. Eve showing the success of the company in merchandising natural gas equipment follows:

"During the past 12 months the company has gained over 400 new customers. During the heating season 1930-31 there were 107 central house-heating plants using gas fuel. These installations, without exception, have proved satisfactory as to service and operating cost.

"In October, 1930, a contract was signed with the U. S. Government for the installation of natural gas service at Maxwell Field. Since this time all heating equipment in the old existing buildings has been converted for gas fuel and all buildings completed and under construction are equipped for gas. The Post will use gas fuel exclusively for cooking, water heating and house-heating. Last Winter the maximum month's consumption at Maxwell Field was in excess of 2,500,000 feet. It is estimated that the maximum month during the heating season 1931-32 will be more than double this figure and when the present construction program at Maxwell Field has been completed and all of the new buildings contemplated are fully equipped for gas, that the Post will consume in excess of 100,000,000 cubic feet of natural gas a year.

"The maximum day's sendout in Montgomery since natural gas has been turned on occurred during February and was 1,087,00 cubic feet. With the additional load that has been taken on during the Summer it is estimated that the maximum day during the coming Winter will be in excess of 2,500,000 cubic feet."

Engineering Cost Accounting in The Gas Manufacturing Plant

JOHN H. WOLFE

Superintendent, Gas Manufacturing Department
Consolidated Gas Electric Light and Power Co.,
Baltimore, Md.

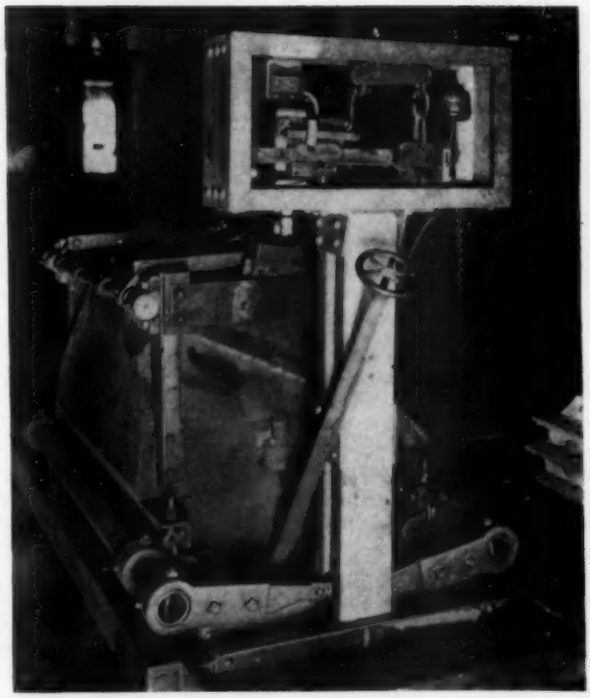


Fig. 1—Type of combined scale and fuel hopper used for weighing input of generator fuel to an individual water gas set. This scale may be automatized by using a motor driven feeder or conveyor belt in conjunction with it. The motor on the belt may be started and stopped through the use of a mercury switch which is actuated by the scale beam on the hopper. The mercury switch is shown at the lower right hand corner of the scale box

ALTHOUGH the old saying that "Knowledge is power" has been used to such an extent as to be almost trite, it still applies with undiminished effect in all fields of human endeavor. In no phase of the utility business is this saying more true than in the matter of cost accounting in the gas manufacturing department.

It is impossible for the Gas Engineer to manufacture and prepare for distribution of a gas or a mixture of gases, if economy and low cost requirements are to be met, unless he knows intimately the minutest details of his business from a dollar and cents standpoint. The magnitude of the problem which he faces will be apparent only when one realizes that the production of gas, with its manifold accounting problems in connection with manufactured and purchased gas supplies and by-product recovery, is probably as involved an accounting procedure as can be found anywhere. Because of this fact it requires an elaborate and exact set of cost accounting sub-divisions, each of which must be numbered and carefully named and still more carefully described, in order that the final result of applying this system in the manufacturing and accounting departments will represent a true and accurate picture, in dollars and cents, of the manifold items which contribute to the cost.

Averting Confusion

In the event that the greatest care and thought are not exercised to make the accounting specifications complete, concise, explicit and reasonably flexible, a lamentable confusion will be the inevitable result. No matter how ideal an accounting procedure may appear to be, it will unquestionably fail if these requirements are not met.

The need for completeness will be apparent to all, since an incomplete system or one which did not provide for and include every item of cost would be worthless.

Accuracy in expression or conciseness is likewise almost axiomatic in principle, since the description of each sub-division or account must be brief and free from the evil of overlapping with other accounts.

It must be remembered that the system will be utilized and interpreted by many different individuals who are employed in both the manufacturing and accounting departments and whose knowledge of the complete system will, of necessity, be more or less limited For this reason the description of the various sub-divisions must be explicit so as to prevent misinterpretation and its attendant evils, misinformation.

Finally, the system must be reasonably flexible in that provision should be made in numbering the various accounts so that new and additional accounts may be inserted without renumbering or rearranging the entire system. When the flexibility requirement to be met necessitates the further subdividing of an existing account, this can be done, in some instances, by the use of decimal subdivisions of the account number.

Remarkable progress was made in the utility cost accounting field at the time that the Uniform Classification of Accounts was adopted. The committees, which worked on accounting problems under the guidance of the national utility associations, both gas and electric, also rendered service of incalculable value to all public service organizations and to the state regulatory bodies to which the various utilities report. This advance in accounting also inured to the benefit of the stock and security holders as well as to the customers. The former received more accurate and complete de-

scriptions of the utility's business, while the latter enjoyed the reduction in rates which the more complete accounting system helped to bring about.

Suggested Modification of Uniform Classification

The Uniform Classification meets the completeness and conciseness portions of the accounting specifications hitherto outlined, but requires some modification in order to meet the other provisions. This modification is required to cover additional accounting problems which have arisen since the classification was originally drafted and also to meet any variations which may be imperative due to local conditions.

A description of a suggested modification of the Uniform Classification may be of interest at this point. For convenience the accounts will be grouped into the four following general classes:—

Raw Materials and By-products
Steam Production
Purchased Gas
Manufactured Gas

Raw Materials and By-Products—All raw materials received at the plant, such as Generator Fuel, Boiler Fuel, Gas Oil, Coal for Carbonization, Producer Fuel and Purifying Materials should be accounted for and charged against the appropriate stock account on the basis of car weights or gallons, if shipment is by rail, or on suitable scales or tank measurements as the case may be. It may be desirable to install secondary scales, in some cases, so as to check the weights billed over the primary scales and to determine losses in transportation. These scales may also be used to determine losses due to degradation of coarse fuels into fines. Losses due to this may be divided by charging the resultant fines against say the boiler fuel stock account at a fair value and charging the balance as a loss to increase the unit cost of the generator fuel or coal carbonized.

Fig. 2—Wet meters used for measuring large volumes of City Gas. This type of meter is very accurate, provided it is kept in good repair so that the rotating drum is maintained in a gas tight condition. A test meter is shown at the right hand edge of the photograph

In the event that the gas oil is received in large shipments it is wise to have the gauging of quantity and tests of quality certified to by an experienced gauger. The oil gaugings should be corrected for temperature to 60°F. when it is placed in stock. All subsequent stock measurements should be made on the same basis so as to eliminate temperature errors in the measurements. In the case of some oils, provision should be made to compensate for losses due to sludging or bottom settlings by setting up a reserve against future charges. This reserve may be established by recording the gallonage of oil received as say 99% and holding the 1% in reserve until the actual amount of the losses, due to sludging and to contained water, are known.

Any materials, which are bought upon chemical specifications, must of course be promptly sampled and analyzed and the correct charge made against the proper stock account.

The stock accounts should be subdivided so that labor charges for unloading and transferring each material may be assessed directly against it.

The quantity of each material charged against the stock accounts should be checked at suitable intervals by the auditor or his representative by means of a physical inventory of the various supplies. By making suitable adjustments, based on the physical inventory, large overages or shortages will be averted which otherwise might step in to distort the cost figures at what may prove to be an inopportune time.

No "Day of Reckoning"

The daily charges from stock to operations are made on the basis of weights and gallonages used through suitable scales and meters, but it is highly desirable to compute monthly consumption of each material by an actual physical inventory of all stocks. Thus, by adding to the stock on hand at the beginning of the month, according to physical inventory, the receipts for the current month and subtracting from this total the stock on hand at the end of the month, according to physical inventory, the total consumption for that month is obtained. This total may be compared to the accumulated daily consumption of each material, according to scales or meters, and a suitable adjustment applied to reconcile the latter with the former. By standardizing on the actual physical inventory method of accounting for monthly consumption of raw materials, one is continually meeting the "Day of Reckoning" and not postponing it, as is the case with inventories which are carried by ledger and which are checked, as a rule, entirely too infrequently by physical measurement to insure uniform and accurate production cost figures.

Stock accounts should also be set up to carry the production of residuals so that any withdrawals or sales may be credited against these same accounts. These stocks should also be checked frequently by means of physical inventory.

Steam Production—Whenever a utility produces or handles two or more gases, a separate account should be set up to show the cost of steam produced by direct firing methods. The steam produced from waste heat boilers may be allowed to remain in the proper production account providing it is used up entirely in that particular process. Otherwise, it should also be included in the steam production account.

The steam produced and consumed by the various departments should be measured by means of appropriate flow meters both indicating and integrating so as to departmentalize and subdivide both the production and the consumption.

Charges for boiler fuel should be made in accordance with the suggestions outlined under "Raw Materials." Other charges, such as cost of superintendence and boiler room labor charges, cost of boiler feed water, including treatment, and maintenance cost of all boilers,

furnaces, stokers and boiler room auxiliaries including both labor and material, should be made to the Steam Production account. The final total cost and subdivisions thereof may be converted to cost per thousand pounds of steam.

This account should receive the proper credit for the steam consumed in the manufactured gas process, for that used in handling and purifying the purchased gases and for that utilized in pumping the finished gas into the distribution system.

Purchased Gas—In purchasing by-product gases, two meters should be installed to measure the volumes transmitted. One, the primary, should be placed at the transmitting end of the line and the other, the secondary, at the receiving end. The secondary meter may be used as the primary without moving it from its position in the event of a breakdown to the primary meter. It also serves as an approximate check on the accuracy of the primary and, most important of all, it furnishes the buyer with information as to the line loss or "leakage." The volume of gas, on a purified basis, which is received at the gas company's secondary meter is the basis for accounting for the quantity sent through the plant, while the amount paid to the vendor is the charge to the purchased gas account. In other words, the per M cost of the gas is based on a volume which has been adjusted for leakage and purification (H_2S) losses.

Fig. 3—This motor driven gas booster does not know the proportions of the various gases which it pumps. The production engineer must know

To the above cost must be added charges for superintendence, purification labor and material, as well as direct and indirect charges, the latter on a volume proportional basis, for miscellaneous labor and material expense. Charges for steam and electric current used must also be made.

Maintenance charges, both direct, to cover repairs to equipment used only for purchased gas, and indirect, to cover the volume proportional cost of repairs to apparatus used for handling the mixed gases, are added to this account.

The cost of preparing for the market any residuals recovered from the purchased gas are charged and the production value credited to this account.

Finally, the volume proportioned cost of storing the mixed gas in the large storage holders prior to distribution, as well as maintenance charges on these structures, are placed against the purchased gas.

The summation of all these items will produce a true cost of the purchased gas after all handling charges have been added.

Manufactured Gas—In the production of the manufactured gas the charges for the raw materials used should be made as outlined under "Raw Materials." This applies particularly to coal for carbonization, to water gas generator fuel, which may be coal or coke, to the carburant if it be gas oil and the steam received from the steam production department. Oil gas or refinery gas, which may be used as a carburant or for reforming, is charged to this account as are cost of superintendence, manufacturing labor, purification labor and supplies, and water used, including cost of treatment. Both direct and a volume proportional part of the indirect charges for miscellaneous labor and material are placed against the manufactured gas account.

Direct and indirect charges for repairs to equipment and apparatus are made through the manufactured gas maintenance accounts. The former are made on equipment used solely for manufactured gas operations and the latter for that used on mixed gas operations.

The cost of preparing for the market all residuals produced as by-products of the manufactured gas operations is added to and the value of the residual produced is credited to this account.

The proportional part based on the volume of manufactured gas of the charges for placing the finished mixed gas in the large storage holders is also added to this account.

The summation of all of the above charges and credits will produce the total cost of the manufactured gas after all handling charges have been added.

Gas Engineer Must Know His Accounts

The incorrectness of the statement that "Figures don't lie" has been proven time after time by individuals who have either misinterpreted or misused the figures obtained from a statement of costs. It seems almost unnecessary to state that the gas engineer must know his accounts in order to use his cost figures correctly but the matter is one which is so often neglected that the writer wishes to reiterate, what may appear to be the obvious, in the hope that error may be averted.

After the correct costs are secured, the gas engineer or production man may, with the help of his accounting knowledge, interpret his cost figures and apply them to his work. He may wish to determine whether or not the use of bituminous coal as generator fuel or heavy oil as carburant will save him money in his operations. If the accounting system which he uses is properly designed and correctly administered, he will know to a surprisingly accurate degree what his present detailed costs are. Each item of cost must be carefully scrutinized and revised in the light of experience to accommodate the changes in cost which will be brought about by changing over to the new raw material. Upon these revisions a new cost set up must be made to compare the estimated future costs with present costs. Thus the effect on manufacturing labor of reduced set capacity when using bituminous as against coke will have to be computed. Also any changes in purification cost because of higher or lower sulphur content will have to be considered. In making up his estimate on whether or not a saving will be realized from using heavy or Bunker "C" oil as a carburant, he will have to consider the relative gallonage which will have to be used to produce a certain B.t.u. as compared to his present light oil consumption. Also

he must not forget the effect of the change on by-product yield and value and existing markets for it. In other words, in the case of heavy oil vs. light gas oil, what can he get per gallon for the two different tars?

Properly calculated cost figures are also useful in following the trend of unit costs of raw materials as well as in analyzing differences in total production costs for contiguous or similar time intervals.

The gas engineer will find that the preparation of budgets for capital or construction expenditures, maintenance and operations are of tremendous assistance in forecasting his costs. One of the beneficial effects of making up these budgets is that the attention of the engineer or works superintendent is focused sharply upon past costs since these must be largely utilized in prognosticating future costs. This study will also show him whether or not the accounting system which is in use meets the demands which he places upon it. His knowledge of the accounting tools at his service will also be refreshed and increased.

Automatic Equipment Necessitates Additional Accuracy

He may find that the accounts as now subdivided do not give him sufficiently detailed information on his maintenance costs. Experience will show him that the more automatic and labor saving equipment he has under his supervision the more necessary it is for him to know the vitally important facts regarding the cost of keeping the various pieces or types of equipment in repair. A general or lump sum classification is, in such cases, practically useless. It is suggested that a job order system for accumulating maintenance costs may be used to good advantage. This job order system can be designed and applied so as to be similar to the system now used by many companies for accumulating the cost of construction work for capital accounts.

In the event that the budgets are made up well in advance and for an annual period, it will be wise to revise these budgets at least quarterly so as to take advantage of and correct for any changes in cost which may have arisen and which were unpredictable at the time of making the original draft.

The gas engineer or production man will find that the information conveyed by these budgets, in addition to the valuable information which they will convey to him, will be heartily welcomed by the management of his company as these budgets will assist the management in predicting with accuracy the earnings of the company and its demands for cash to meet payrolls and raw material charges.

The engineer will find that it will be necessary to accumulate at the plant office some of the basic data for the charges to the regular accounts. These data sheets will also be of great value to him as guides for his operations. The writer has found the following data sheets to be of value in his work.

(1) Data sheet showing the breeze recovered from each shipment of coke. This is posted daily and averaged monthly.

(2) Data sheets showing the tar recovered from the separators and through the tar stills and from holder pits. Averaged monthly to show percentage recovered each way and computed to show per cent of total tar recovered to oil used.

(3) Data sheet showing comparisons between fuel consumed by boilers as shown by sum of individual boiler scales as against the master scale which shows all fuel sent to the boiler room. Posted daily and totaled weekly and monthly.

(4) Data sheets showing comparisons between primary and secondary scales on all fuels received. Posted daily and totaled monthly.

(5) Data sheet showing comparison of readings on primary and secondary meters on purchased gases. Differences shown as cubic feet and per cent leakage. Posted daily and totaled and averaged weekly and monthly.

(6) Data sheet showing proportions of H_2S load and purification accomplished by liquid and dry box purifiers on purchased and manufactured gases. Posted daily and totaled monthly.

(7) Data sheet showing B.t.u. input from component gases as against outturn in mixed or finished gases. Shown as millions of B.t.u. feet (Product of total volume for day in cubic feet and hourly volume weighed daily average B.t.u.) computed and posted daily and totaled monthly. Although B.t.u. cannot be accounted for the same as something tangible such as currency, a surprising degree of concordance may be obtained, providing the meters and calorimeters are kept in first class condition, checks of 1% or under being not infrequent.

(8) Data sheet showing consumption of generator and boiler fuel as indicated on scales and gas oil as registered on meters as against consumption of these materials based upon receipts and month end and physical inventories of stock. This sheet also shows the amount of the adjustment to monthly total of daily weights and gallonages to reconcile them with the inventory. Computed monthly.

Too much stress cannot be laid upon the necessity of making frequent and regular checks on all metering, weighing and calorimetric equipment since these are the cash registers through which the utility spends the bulk of its money for manufacturing operations.

In concluding, the writer wishes to acknowledge his appreciation for the work done and the information furnished by the accountant to the production engineer. The gas engineer will find that a full and complete co-operation with the accounting department and the greatest frankness and candor in dealing with the accountant will result in benefits of inestimable value both to himself and to the management of his company.

Super - Selling

MORE automatic gas refrigerators were sold during the month of July by the Consolidated Gas Company of New York and affiliated gas companies than during any previous month in the four years that the company has sold this household appliance.

Orders for 5,916 gas refrigerators were received during the month, as compared with 4,601 in September, 1930, the previous high month. Sales in July were 60 per cent ahead of July, 1930.

During the first seven months of the year, there was a 105 per cent increase in the number of automatic gas refrigerators installed for customers in the territory served, including Manhattan, Bronx, Westchester, and portions of Queens. From January 1 to July 31, 1931, 20,924 gas refrigerators were installed, as compared with 10,216 for the same period last year.

The Ignition Arch Carburetor—Installation and Its Operation at Pittsfield, Mass.

THOMAS A. HOLDEN
Pittsfield Coal Gas Company

THE relative advantages of this method of introducing oil into a Carbureted Water Gas Machine were carefully gone into by the Pittsfield Coal Gas Company early in the Spring of 1931. It appeared to us, at that time, that there was a very good possibility of reducing the cost of gas in the holder by this process. Arrangements were accordingly made with the Semet-Solvay Engineering Corporation, who have developed and are marketing the process, to change over our ten foot Backrun machine for carbureting gas by this method.

Although this process was primarily developed for the purpose of enriching the *heavy* oils, the price differential between these oils and the ordinary gas oils was so slight at that time that it was decided to see what could be accomplished with the oil we were then using. On this basis there appeared to be a promise of accomplishing the following:

What the Changeover Promised

First—Bettering the oil results obtained when using the standard checkered carburetor by better vaporization before it came in contact with the checkers.

Second—Saving of generator fuel by more efficient combustion of the producer gases and consequent reduced blasting time.

Third—Eliminating the expense connected with the periodical renewals of the carburetor checker brick.

Fourth—So remodeling the equipment that it would be possible, with the addition of pumps and preheaters, to change over to the use of heavy oils and thus be in a position to use the most economical oil at any time.

The machine on which this has been tried out was built by the Semet-Solvay Engineering Corporation in the early part of 1930 and started in operation on May 23, 1930. It is equipped with Backrun and U.G.I. Automatic control and uses low pressure steam from a Smoot accumulator. The fuel is fed from overhead storage bins for coal and coke through proportional feeders and conveyors to an automatic charging machine and into the generator, every run, in quantities sufficient to maintain the fuel bed at a constant depth. During the operation to date, a mixture of approximately 20% Pittsburgh district coal and 80% Troy coke has been used. This particular percentage was used throughout to obtain comparative data with previous operation where accurate data had been kept using this mixture.

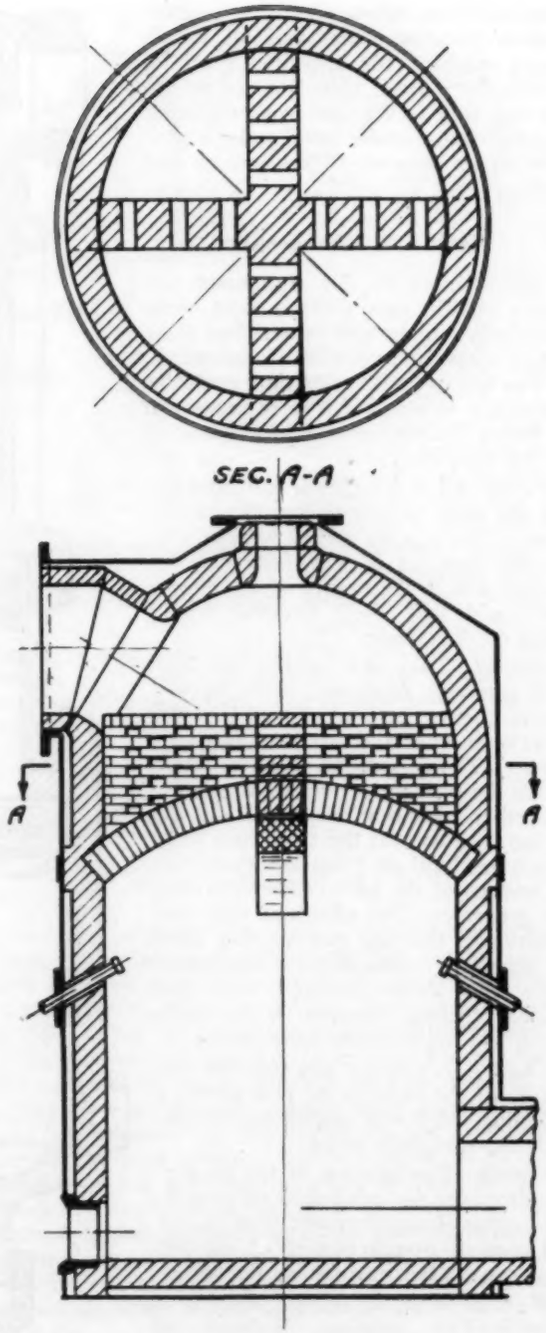


Fig. 1—Ignition Arch Carburetor

With the exception of the last few days, a five minute cycle was used which was balanced for coke operation and no attempt was made to disturb the regular plant operating conditions. In comparing the results obtained, it will be well to keep in mind that due to load conditions and pressure thrown by the storage holder, it has been found advisable to operate in two shifts of from 4 to 5 hours in the morning and from 3 to 4 hours late at night; making a total of from 7 to 8 hours opera-

Presented at Meeting of Operating Div., New England Gas Assn., Pittsfield, Mass., Sept. 18, 1931.

tion per day. This, of course, means serious standby losses and an unbalanced machine for obtaining good oil results for a large proportion of its operating time. We are contemplating making changes which will make it possible to produce all of the gas on one shift.

Details of Changeover

The changes to this equipment for trying out the new process were comparatively simple and caused less than a two weeks' suspension of operation. It was apparent that this time could be materially reduced, if it were necessary in future installations. They consisted of the following:

First—All checkerbrick and supporting tile were removed from the carburetor. The bottom arches were left in at this time as it was felt that the change was in the nature of an experiment and that their removal would make no difference.

Second—Two new arches, of high heat resisting material, were sprung across the carburetor at right angles from each other and one just above the other. These ignition arches, from which the process derives its name, are located in elevation very near the top of the shell so that the two cross walls which are built on them are even with the bottom of the inlet connection from the generator. The effect of this construction is that the gas entering from the generator comes into a dome shaped space and leaves through four pie-shaped openings formed by the walls which are built on the two arches.

Third—To prevent any possible distortion of the shell by the new arches a stiffening band was placed around the shell opposite their bases.

Fourth—The location of the tangential air mixer for admission of secondary air was changed to secure an earlier and more thorough mixing of air and producer gas before entering the carburetor.

Fifth—The existing Anthony oil spray was removed from the top of the carburetor and a quick opening door for observation was put in its place.

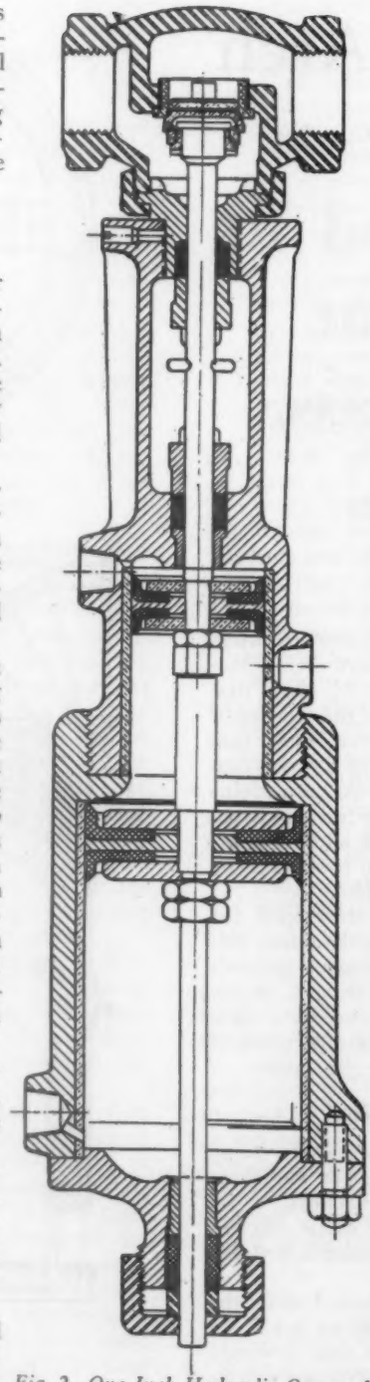


Fig. 2—One Inch Hydraulic Operated Double Piston Valve

Sixth—Four new Anthony sprays of special design, having three spuds in a horizontal position, were located in the shell at equal spaces around the circumference at a 30 degree angle. These were placed at such an elevation that the oil was discharged into the shell at a point below the bottom of the arches and would be thrown toward them or countercurrent to the flow of the blue gas. (See Figure 1.) The new sprays were then connected to the oil line formerly supplying the old top spray by means of a manifold designed for equal distribution and to a manifold supplying the necessary steam for purging. The usual hydraulic valves and check valves were used and so arranged that the steam and oil could not mix in the manifolds. An attempt was made at first to use low pressure steam for purging; but this was found inadequate and a special valve was designed and built by the manufacturers which makes it possible to adjust to any desired quantity and time the admission of high pressure steam automatically after each oil admission (See Figure 2 and 3.)

Seventh—In this installation, for purposes of study, another quick opening door was installed on the side of the carburetor shell for observing the under sides of the arches. Also a series of pressure and pyrometer openings were provided for obtaining data.

Before the machine was started up a pressure and velocity survey was made at all points across the carburetor below the ignition arches, to determine whether or not an equal distribution of air and gas could be expected. These studies wee made with quantities of air for the various rates and indicated satisfactory uniform conditions with no apparent gain to be made by a rearrangement of the brickwork.

Underlying Theories

The theories prompting the various changes outlined are:

First—That the producer gas should be forced into ignition at a definite predetermined point to insure complete combustion and proper distribution of heat; also to prevent delayed ignition with consequent loss in efficiency and damaging explosions when lighting back.

Second—That a chamber should be provided of ample size to complete combustion before the heat generated is applied to the surfaces to be heated, as is done in any modern boiler installation.

Third—That it is advisable to preheat the uprun blue-gases, previous to their mixing with the oil fog, to a higher temperature than was formerly possible, by radiation from and contact with the additional brickwork in the arches and walls, as well as the dome in the top of the carburetor. This is possible in the new construction, due to the fact that no dense oil fog is present in the top of the carburetor to stop the radiation of heat from the highly heated brickwork. This is based on the theory that the only heat available for changing the oil from a liquid to a vapor, before reaching the checkers, has been the sensible heat of the blue gas. In the usual type carburetor, the oil travels in the same direction and each particle is therefore surrounded by the same atmosphere of blue gas until it reaches the checkers; which was a comparatively short distance.

Fourth—That it was advisable to provide for counter flow of oil and blue gas up to the time that the oil loses its velocity or becomes a vapor and starts traveling with the blue gas. This, of course, makes it possible for the oil to absorb far more of the sensible heat from the,

now hotter, blue gas and insures its complete vaporization.

Fifth—That it was advisable to provide the maximum space and time of contact between the oil and gas for complete vaporization before coming in contact with the porous checker material. The rate of flow through the bottom half of the carburetor is now approximately one-quarter what it formerly was due to the removal of the checkers.

Sixth—That it was advisable to do away with the checkers in the part of the machine which is used for vaporizing oil so that no oil can soak into them in the form of a liquid and burn off during the next blast with consequent loss of expensive enrichment.

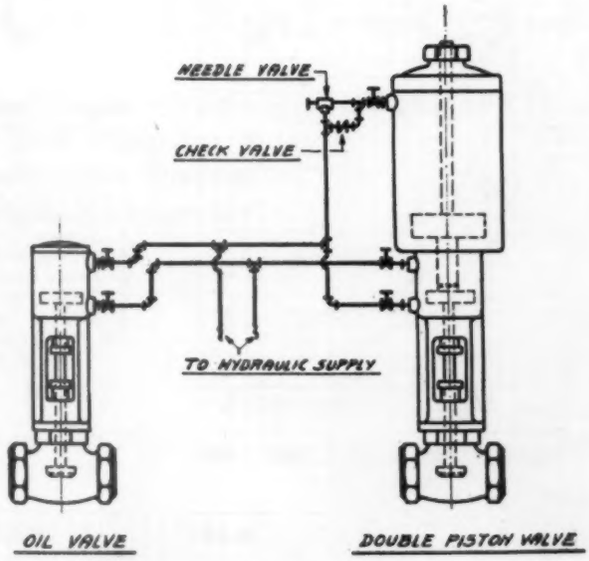


Fig. 3—Diagram for Connections to Oil and Steam Purge Valve

Seventh—That it was advisable to eliminate the necessity for replacing checker material.

Eighth—That it was advisable to reduce back pressure.

Data and Results

As previously stated, the oil used during this operation was the same as had been used for some time at this plant and has the following characteristics:

Gravity	34 to 36 Baume
Carbon	.02% by weight
Sulphur	.073% by weight
B.t.u. per gallon	136,000 to 137,000
Recovery as enrichment	77.6%
Distillation—	
300 F. to 500 F.	52.9%
500 F. to 650 F.	40.2%
650 F. up	6.9%
	100.0%
Paraffines	52.3%
Naphthalenes	20.3%
Aromatics	15.1%
Olefines	9.3%
	100.0%

The remodeled machine was put in operation on June 25th, and ran until July 7th, when it was decided to shut down for inspection and some plant repairs while the commercial holder was being held to the top of the guides for painting. This condition existed during part of this run period and seriously affected results as the operation of the machine was very intermittent. In spite of this, however, and the fact that it was necessary to experiment to find the correct heat balance and operating conditions, the following results were obtained:

Make per hour	163,000
Fuel per M (22%) coal	27.7 lbs.
Oil per M	2.83 gals.
B.t.u.	528
B.t.u. recovery per gal. of oil.	101,560
Percent recoverables recovered	96%

The highest and lowest B.t.u. recovered per gallon of oil for a day's operation during this period were 106,000 and 96,600.

The machine was started up again on July 20th and operated until August 8th when it was shut down to tie in the new waste heat boiler. During this period of operation the average results were:

Make per hour.	157,800
Fuel per M (23%) coal ..	27.5
Oil per M	2.8
B.t.u.	532.9
B.t.u. recovered per gal. of oil.	104,170
% recoverables recovered	98%

For seven days of this period, the oil per M. averaged 2.75. The best recovery was 106,600 and the lowest was 98,900 B.t.u. per gal.

It is, of course, true that results of this kind do not have any real significance except as they are compared with what has been accomplished under the same conditions with the same machine before the changes were made. During the seven months of 1930 that this machine was operated, Troy coke was used as a fuel; all other conditions being comparable. The results during this period were as follows:

Make per hour	147,997
Fuel per M	28.8
Oil per M	3.13
B.t.u.	531.4
B.t.u. recovered per gal. of oil	95,000

It can readily be seen that a very marked improvement has been accomplished over last year's operation, and with the indications which we have had from the various things tried out so far, there is every reason to believe that far better economies can be effected with a continued tryout and the refinements which invariably follow with the development of any new process.

Several changes have already been made in the size and arrangement of the spuds on the oil sprays to secure the most effective distribution of oil in the carburetor and at the time this paper is being written, the machine is again being put into operation with the old bottom arches removed and still another arrangement of spuds in an attempt to secure that proportion of the enrichment value of the oil which, in the past, has not shown up either in the separator as tar or in the holder as B.t.u.

Inspections made of the interior of the carburetor, after each run period, have shown no deterioration of any of the brickwork either in the walls, domes or arches and aside from a smokelike film in one or two spots, the size of a man's hand, there has been no carbon deposits or evidence that the oil has come into contact with the brickwork. With this condition continuing, the life of the carburetor is, of course, indefinite. It will be interesting to note that this machine has been started up cold three times to date and operated about six weeks at this writing with no explosions or lighting back in carburetor.

Temperature Ranges

During the operation of the machine, a series of temperature readings were taken through the carburetor

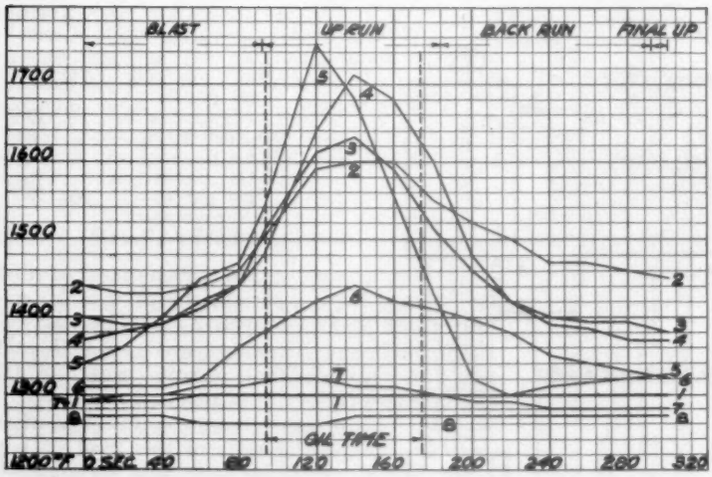


Fig. 4—Temperatures in Ignition-Arch Water Gas Machine at Pittsfield

1—Angle Connection
2—Top of Ignition Arches
3—Center of Ignition Arches
4—Bottom of Ignition Arches
5—18" below Bottom of Ignition Arches
6—Cross-Over
7—Middle of Superheater
8—Top of Superheater
Oil is vaporized in zone measured by Nos. 4 and 5 Thermocouples

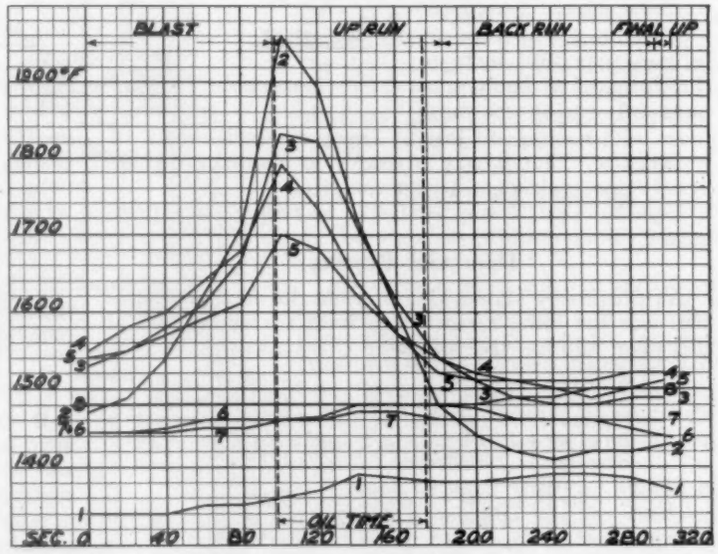


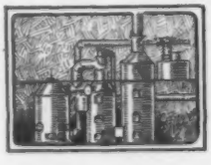
Fig. 5—Temperatures in Checkered Carburetor Water Gas Machine at Pittsfield

1—Angle Connection
2—Top of Checkers
3—4th. Course of Checkers from Top
4—8th. Course of Checkers from Top
5—12th. Course of Checkers from Top
6—Cross-Over Connection
7—Middle of Superheater
8—Top of Superheater
Oil is vaporized in zone measured by No. 2 Thermocouple

and superheater to show the heat gradients during the run. These are shown on Figure 4. Heat gradient through the machine when using checker carburetor is shown on Figure 5. It will be noted from these, that the heat in the zone at the arches is more uniform with the new method of operation than it formerly was when no heat reservoir was available for supplying the heat of vaporization for the oil, before its contact with the checkers.

Summing up what has been indicated in savings per year, by the last run period, as against last year's results, we find that by using $9.00 per ton coke and 5c per gallon oil, with an average sendout per day of 1,250,000, the saving per year would be $10,200 on oil and coke alone, with an additional saving in not being required to shut down and start up the spare machine for the renewal of checkers, making an estimated total saving of about $11,500.

It can readily be seen that with the machine in the shape it now is, the matter of handling heavy oil is very well taken care of and that whatever fixed carbon is left in the carburetor can do no more than accumulate in the bottom of the shell, to be removed during the cleaning period. In this connection, it is definitely planned to try out some of these heavy oils in the very near future, so as to be in a position to know exactly what can be accomplished with them and at what price differential it will pay to use them.



The Gas Plant Goes Robot

New York Power and Light Corporation's Butane Plant at Canajoharie is entirely automatic and supplies a well designed Distribution System which serves an increasing number of satisfied customers

HENRY M. RILEY
Editor, American Gas Journal

Fig. 1—General View of Plant. Tank in foreground 8 feet diameter by 70 feet long for finished gas. Other tank shown in part, 8 feet diameter by 40 feet long for Butane storage. Two doors on right enter Gas Generating Room. Door on left enters Electrical Control and Calorimeter Room.

THE trend in gas operating technology along automatic lines has been truly phenomenal during the past decade. This development has made for uniformity of product and its subsequent distribution and utilization, has lessened toil on the part of the workmen, and has more and more brought gas problems into the category of highly mechanized procedure.

There recently has been installed and put into operation in the town of Canajoharie, New York, a Butane-Air gas plant which stands well in the front of automatic control advancement; this plant virtually runs itself.

The problem involved in giving gas service to this community and its sister town, Palatine Bridge, just across the Mohawk River from Canajoharie, presented two solutions: one to extend the high pressure transmission gas main from Tribes Hill, approximately seventeen miles away, and the other to install a Butane-Air gas plant in Canajoharie. When all the factors in each case had been taken into account the second solution of the problem was found to be considerably the less expensive.

Fig. 2—View of Generating Room. All equipment is shown except station meter and regulator, building heating unit heater, and ventilating blowers. In the rear is shown the wire glass window between the Control Room and the Generating Room. Vapor Meters shown in center; next, Air-Gas Temperature Equalizers and then, Kemp Mixing Valves on concrete foundations. In the upper right is shown the Compressor Jacket Water Cooling Unit with fan.

Layout and Operation of Plant

The plant consists essentially of a Mixer Building in which are housed the various apparatus and control devices for properly mixing the Butane with air and feeding the mixture into the gas holder from which the distribution system is supplied, and two storage tanks located on the outside and adjacent to this building. (See figure 3).

One of these tanks, the butane holder, is used to store the Butane as it comes from the tank car, while the other, styled the gas holder, receives the mixture of Butane and air, which has been previously automatically mixed in the Mixer House, and feeds it to the distribution system as the customers' demand occasions. The Butane holder measures 8 feet in diameter by 40 feet long and holds about 15,000 gallons. It is of interest to note that this amount of Butane will provide base material for a four months' supply of city gas; that is, a mixture of Butane with the proper proportion of air. Delivery is made in car lots of 10,000 gallons of Butane as required.

The gas holder, containing the Butane-Air gas mixture, is 8 feet in diameter by 70 feet long, and is one of the largest tanks of its type ever shipped in one piece, having been transported on two flat cars. This tank contains the Butane-Air gas mixture at a nominal pressure of 75 pounds gauge, this being equivalent to 21,000 cubic feet, at 4 inches of water and standard temperature, and will take care of about 80 percent of the average daily demand.

Before proceeding with a detailed account of the progress of the Butane from the tank car until it leaves the gas holder as a mixture of air and Butane for customer use, it is essential to state that the electrical automatic controls and all generating equipment except

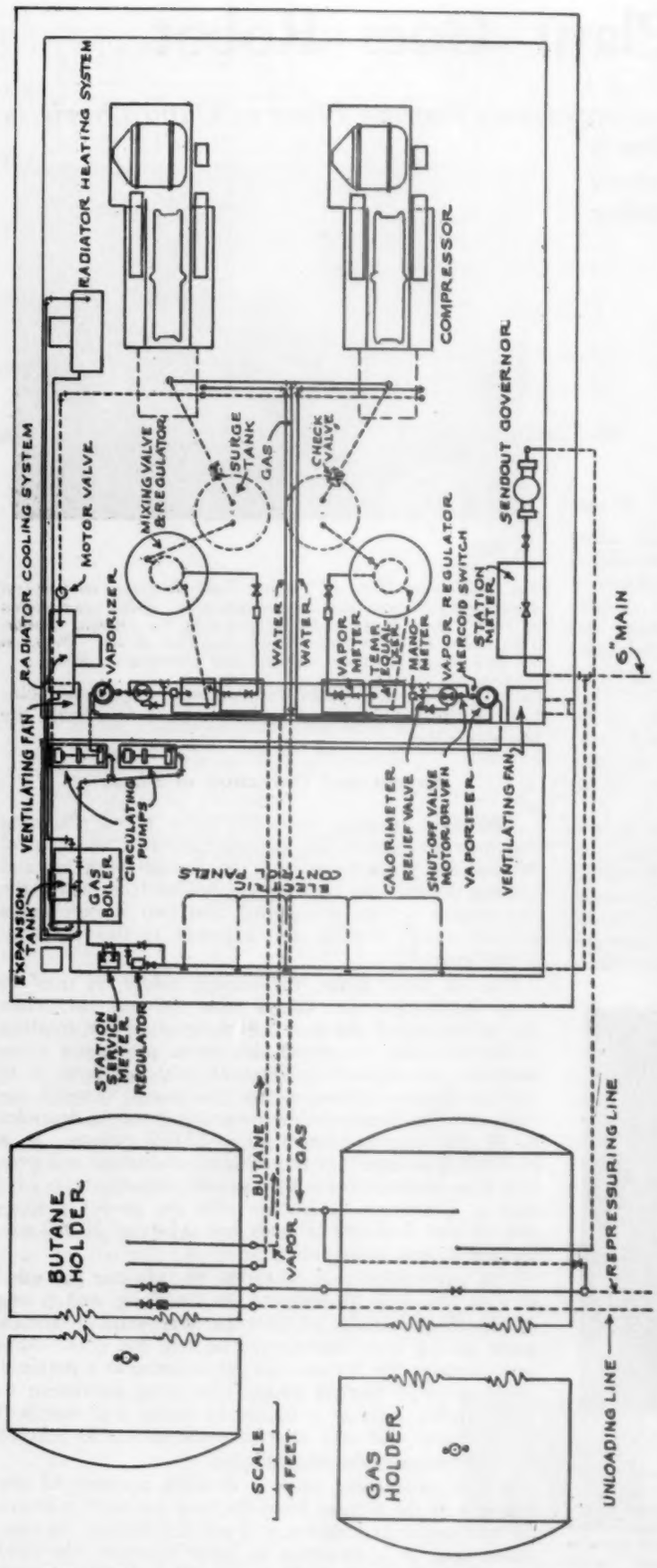


Fig. 3--Plan of Butane-Air Gas Plant of Canajoharie, New York.

the gas boiler for supplying vaporizing heat are in duplicate, although only one unit is ever in operation during a given interval.

The operation of the plant, (see figure 4), is controlled by the pressure of the Butane-Air gas mixture in holder 9, which supplies the gas to the distribution system through a station regulator 10, and station meter 11. When the pressure in the holder 9 drops to 40 pounds gauge the plant is automatically set into operation; when the holder pressure is subsequently built up to 75 pounds gauge the plant is automatically shut down. Electrical driven compressors 8 furnishes the motive power for operating the plant. It draws the Butane and air through the mixing valve 6, and discharges the finished Butane-Air gas mixture into the holder 9. The pressure in the Butane storage holder 14 forces the Butane (either in liquid or vapor form) through the equipment to the mixing valve 6.

If the Butane in the storage holder 14 is above 30 pounds gauge pressure the Butane vapor is used directly, without vaporization; if the pressure is below this point, Butane liquid is used. The operation of the motor actuated valves M and M^1 on the Butane liquid and Butane vapor supply lines is controlled by pressure switch 1. The pressure actuates the switch and, if above 30 pounds gauge pressure, it closes off the liquid and opens the vapor valve; if below 30 pounds gauge, the reverse takes place. The pressure regulator 2 reduces the Butane pressure to 10 pounds gauge at the outlet of the vaporizer 3. Vaporizer 3 vaporizes the Butane when liquid is being used.

Heat for vaporization is supplied by heated water from the gas fired boiler 12, and this hot water circulates continuously while the plant is in operation, regardless of whether Butane vapor or Butane liquid is being used.

From vaporizer 3 the Butane vapor travels to pressure regulator 4, which maintains a pressure of 4 inches of mercury on the inlet to the air-gas temperature equalizer 5. The vapor then passes through coils in 5 and the air for gas making passes over these coils, in order to make the temperature of the air and Butane equal before entering mixing valve 6. This mixing valve 6 properly proportions the quantities of air and Butane gas to give a 540 B.t.u. mixture, which consists approximately of 17 per cent Butane vapor and 83 per cent air. Receiver 7 prevents compressor pulsations in mixing valve 6. The 8" x 10" single stage compressor 8, driven by a 30 horsepower motor, compresses and pumps the finished gas into storage holder 9. Approximately 5½ gal. of Butane produce 1M of city gas.

About one half the heat for vaporization is obtained by circulating the water for vaporization, as it leaves the vaporizer 3, through the cylinder jacket of the compressor 8, from which it returns to boiler 12 for additional heat necessary for vaporization.

When Butane liquid is used for gas making, valve V on the water circulating system is open and valve V^1 is closed, so that the hot water from the compressor cylin-

der jacket goes directly to the boiler 12. When Butane vapor is used for gas making, no heat is required for vaporization and valve V is closed and valve V' open; this circulates the water leaving the compressor through the cooling radiator 13 where the temperature of the water is reduced to 110 deg. Fahr., which is the temperature thermostatically maintained by the boiler for vaporization. Valves V and V' are motor operated and function simultaneously with valves M and M' and are controlled by the same switch 1.

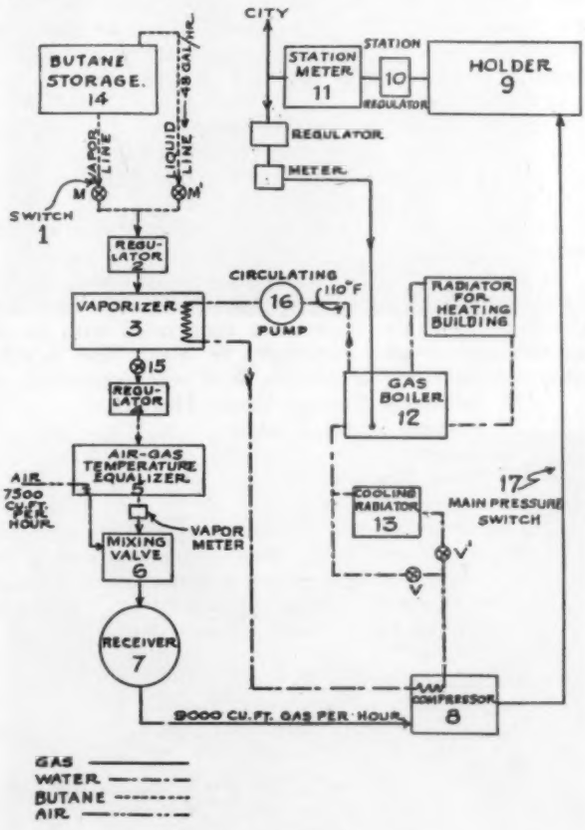


Fig. 4—Flow Sheet

When the main pressure switch 17 makes contact to start the plant, the electrically driven circulating pump 16 first comes into operation to assure an adequate supply of hot water in the vaporizer 3, and the main shut off valve 15 opens. After a time delay of about one half minute the compressor starts and the ventilating fan stops. The generating room during operation is ventilated by the air that enters the air-gas temperature equalizer 5 for gas making. When the units are shut down the small ventilating fan near the floor operates for ventilation.

This plant which is entirely automatic, requiring normally no attendants, has duplicate generating equipment, as stated above, so that if one unit is shut down by any of its protective devices the standby unit is automatically thrown into operation, at the same time ringing a buzzer in the local superintendent's office, located in the business section of the town, and his home. Either unit may be operated as the preferred set.

Under normal conditions one unit operates regularly and the adjustment of the mixing valve 6 is controlled by a Btu recorder and controller. (See figure 5 for sample of chart from this recorder.) The recorder also acts to shut down the sets if the Btu generated becomes excessively high or low. Any difficulty causing shut down of the regular unit automatically puts the second or standby unit into operation.

Protective devices shut down the preferred set and transfer operation to the standby unit from any of the following possible causes:

a—Overheating of any of the compressor bearings and compressor cooling water.
b—Interruption to supply of Butane.
c—Flooding of the vaporizer 3, due to failure of the gas burner in the boiler or of the water circulating pump 16.
d—Electrical overload on any of the motors.
e—Generation of excessively high or low Btu.

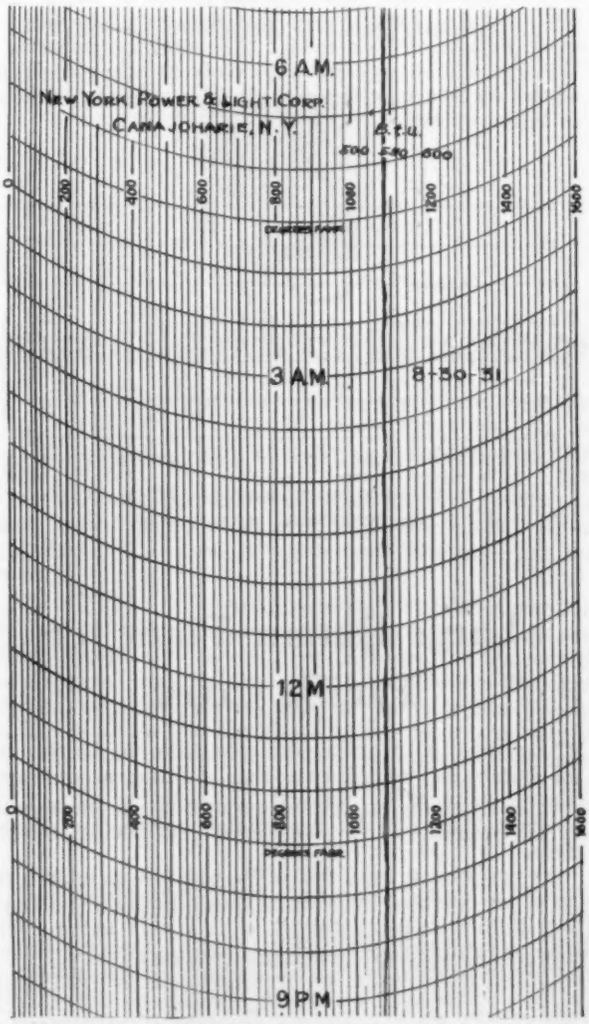


Fig. 5—Sample of Chart from Btu Recorder-Controller

The plant is located adjacent to an electrical substation so that the possibility of an interruption to the electrical supply is remote. As previously mentioned the plant operates normally without attendance and to prevent danger from possible gas leaks, the electrical controls and gas boiler are housed in the control room which has no openings to the generating room. All motors and other electrical equipment in the generating room are of the explosion proof type.

After leaving the station meter 11, which is of cast iron and 500B in size, the Butane-Air gas mixture enters the distribution system at a pressure of 2 pounds

gauge. (There is a recording pressure gauge on the principal distributor main at the plant.) Incidentally, the gas mixture has a heating value of 540 Btu per cubic foot and a gravity of 1.18. In general, the distribution system consists of 8900 feet of six inch mains, 3600 feet of three inch and 44,200 feet of two inch.

Each customer's house line is equipped with a regulator which reduces the pressure to 4 inches of water.

There is no unusual maintenance on the distribution system and if any drip develops, it will take place at the holder. As a detector, ethyl mercaptan is introduced into the gas at the city holder. The distribution system is planned to take care of the territory's needs for many years. All mains are steel, coated with enamel for protection against corrosion. Joints on the 2" and 3" sizes are welded. The 6" size was laid with couplings to avoid expensive ditch welds. The final test pressure on the distribution system was made at 25 pounds per square inch gage, which will probably never be exceeded in actual operation.

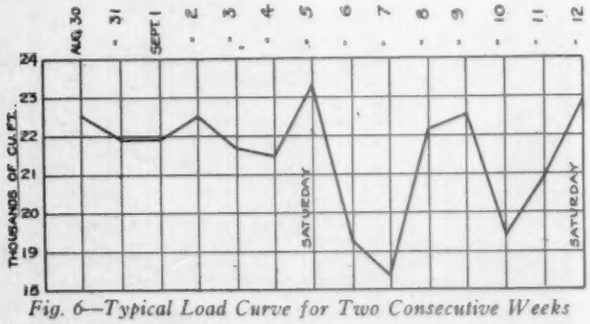


Fig. 6—Typical Load Curve for Two Consecutive Weeks

Cast iron meters of a capacity of 175 cu. ft. per hour are used on the customers' premises and their repair will be taken care of at the company's central repair shop in Albany. It is noteworthy that not a single complaint was registered during the construction of the distribution system; also, the city was given the contract for replacing paving, thereby making for good relations. The pipe cover is two feet.

Marketing Appliances

The district served has a population of 3400 and, of this number, to date there are on the books 325 customers, which, it is expected, will increase to 580 in five years' time. The present average output for a day is 21,000 cubic feet, each customer having an average monthly bill of $4.50. This latter figure is based upon a rate as follows:

$1.00 for the first 400 cubic feet
21½ cents per C for the next 1600 cubic feet
$1.30 per M for the next 23,000 cubic feet
$1.00 per M for all over 25 M

Figure 6 shows a typical curve load curve for two consecutive weeks.

In marketing appliances the company makes use of its electric office and display room in Canajoharie and the local appliance dealers are cooperated with to the satisfaction of all concerned. In about one month's time the following appliances have been connected:

118 Automatic Storage Water Heaters
20 Sidearm Water Heaters
250 Ranges
3 Space Heaters
1 Electrol Heater

Of the above ranges, 83 were combination coal and gas ranges, the coal being used solely for heating the kitchen. Incidentally, one family houses predominate.

This sales record is assuredly worthy of commendation and assures a fine future for the company.

Large Butane Plant for Pacific Coast

EL Centro, California, will soon have the largest air-butane gas plant on the Pacific Coast, according to plans announced by Natural Gas Corporation of California calling for the immediate construction of this plant.

At the present time this is the only oil manufactured gas plant operated by Natural Gas Corporation of California, the property formerly being known as the Inland Empire Gas Company and becoming a part of the Natural Gas Corporation system during the latter part of 1930. The conversion of this system to air-butane gas will be completed without interruption to present service and it is anticipated the new plant will be ready to cut over during the latter part of November or first of December of this year.

The El Centro Plant will have a capacity of 60,000 cubic feet of gas per hour. There will be two 15,000 gallon liquid storage tanks, with a total gas storage capacity of 135,000 cubic feet, approximately 90,000 cubic feet of which will be comprised of the present low pressure storage holders while new high pressure tanks will make up the additional 45,000 cubic feet.

The new plant building will be located on the present property of the company at El Centro, and when completed will be not only the largest on the Pacific Coast, but from present indications will also be serving the largest number of consumers of any air-butane plant in the United States.

A number of low pressure mains are also being converted to a high pressure service, which will give El Centro one of the most modern and up to date gas systems in the state.

Natural Gas Outlook in Michigan

THE Utilities Information Bureau of Michigan has issued a review of the oil and natural gas situation in the state as of September 10, which shows the following recent outstanding natural gas development:

Discovery wells in the Central Michigan area have revealed or indicated stores sufficient to warrant supplying natural gas commercially to four communities with an aggregate population of 15,090. Consumers Power Company began late in August to furnish gas to Midland, taking it from the Broomfield township field west of Mt. Pleasant through a 40-mile pipe line costing $250,000. At the same time, the Gas Corporation of Michigan began to furnish gas to Mt. Pleasant, Clare, and Rosebush from the Vernon township field.

Gas Corporation of Michigan officials estimate there are reserves in the present Vernon and Clare proved fields sufficient to supply one million cubic feet of gas a day for 17 years.

The Lindewelder in use on 26 inch Natural Gas Pipe Line on the Pacific Coast

Fast Welding Cuts Line Costs

New Lindeweld Process of oxy-acetylene welding reduces labor and materials costs on long-distance pipe line work to unusually low figures and speeds up construction

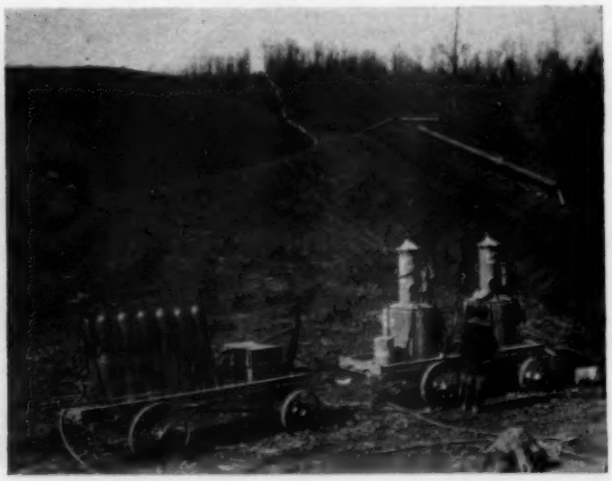
Pipe turner rotates pipe at correct speed for making rolling Lindewelds

EDITORIAL STAFF INTERPRETATION

SPEED in pipe-line welding work is synonymous with lower cost. It means lower charges for both labor and materials as well as quicker completion for service of the transmission line. Distribution and natural-gas engineers will, therefore, be interested to investigate the new Lindeweld apparatus and process which is now available for this work.

As a result of scientific research and laboratory investigation, this new process, distinct in several features from previous procedures, has been evolved for manual application; and a new welding blowpipe has been perfected, which for certain types of joints produces welds at a rate from 3 to 3½ times as fast as was obtainable in the past by the customary oxy-acetylene process. There is nearly a proportional reduction in cost. This new method represents a practical application of metallurgical knowlege to oxy-ocetylene welding, that pro-

The position of the operator using the Lindewelder is one of ease and comfort throughout the welding operation



Manifold Oxygen Cylinders and Acetylene Generators mounted on Trucks; an efficient portable Gas Supply for Lindewelding

duces superior welds at a greatly increased speed. Its application in over 2000 miles of welded overland pipe line construction throughout the country, ranging in size from 4 inches to 26 inches, has given very convincing results in speed of construction, economy, and efficiency of welds.

High strength welds at high speed with this welding are achieved by three inter-dependent, inter-related features: A special flame adjustment, the use of special welding rod, and a new welding technique. The welding is done with a carbonizing flame in which the weld metal is fused with the base metal through the medium of a low melting point, high-carbon iron alloy. The new welding rod, which has suitable metallurgical characteristics to produce fusion with the lower melting high-carbon iron-alloy surface, was developed especially for this application.

The welding technique recommended is in general what is known as "backhand" welding, in which the flame is pointed backwards against the weld. The flame and rod are manipulated more or less parallel to the line of welding; and the flame is alternately played upon the base metal to prepare it for fusion and on the rod for accelerated deposition of weld metal. Very little breakdown or melting of the base metal is required with the correct procedure. Hence a much smaller space can be used, due to the decrease in the contraction of the weld, and economy is effected in the amount of rod, welding gases and time required for each joint.

The process can be adapted to the present type of hand blowpipe. But the process is better made almost automatic by the use of a special blowpipe developed for exclusive use with this method. With the use of this new blowpipe, called the Lindewelder, it seems possible to obtain welding speeds, equal to, or greater than, those obtained with any other process. The new blowpipe has two flames and an automatic gravity-feed rod holder; a carriage with two runners supports the apparatus during the welding operation. The two flames and the rod holder are aligned in the same plane, which is also the plane of the pipe joint. The lower flame is the welding flame, which is used for preparing the base metal for proper fusion with the weld metal and for actually melting the end of the welding rod in the welding puddle. The upper flame is smaller and is used for preheating the welding rod. This preheating flame is arranged so that the inner cone impinges directly upon the rod, which is preheated to a bright cherry red, and thus little additional heat from the welding flame is required to melt it into the welding puddle. As the welding operation is carried on by the "backhand" method, the completed weld is on the opposite side of the rod from the welding flame.

The position of the operator during the welding is such that he may work with a minimum of fatigue and a maximum of comfort, standing or sitting at the side of the pipe facing the joint. This position is possible for all pipe sizes and also for horizontal tank welding. Since only one hand is required to hold the blowpipe, the operator is free to make any necessary adjustments to the flame, change the rod, signal the turner, or, if he wishes, shift the blowpipe to the other hand without any interruption to the welding operation. Another advantage in the position assumed by the operator is that as the welding progresses toward him he can see both sides and the bottom of the vee at all times, and thus most accurately control the quality of the weld.

All adjustments necessary for the operation of the blowpipe may be made by the operator's right hand. A lifting device controlled by a trigger on the blowpipe handle permits the operator to raise or lower the welding rod, as required in starting, passing over tack-welds, changing rod, or finishing; the possible travel of the lifter is about 2½ in. But the rod is free to feed into the weld when the lifter trigger is forward, and is gripped by the device only when the lifter trigger is pulled back.

The welding is always under the instant control of the operator; practically the only manipulation required is a slight raising or lowering of the handle. By lowering the handle the main welding flame is brought to impinge more directly on the base metal in order to prepare it more quickly for fusion; by raising the handle the flame impinges more directly on the rod, accelerating rod deposition when desired.

Increased speed of welding has been shown in field application; the number of rotated welds per day per welder on some lines has been increased threefold over that secured on similar size lines following former procedures for pipe line construction. The time for mak-

Long Sections of 20 inch Pipe Lindewelded by hand Blowpipes on Columbia Gas and Electric Company Natural Gas Pipe Line

ing joints on 20-inch pipe with $\frac{5}{16}$ in. wall, on one large line where the new blowpipes have been used with the Lindeweld process, varied from 14 to 19 minutes. On a 26 in. gas line, a maximum production per welder of 25 joints has been obtained in a nine-hour day. The increased speed has not been accomplished at sacrifice of quality.

When the Process was first introduced, some of the pipe line companies and contractors did not fully appreciate the speed which it made possible, and, as a result, they did not at first coordinate the rest of their pipe-line organization with the speed which could be obtained from the welders. In a number of cases, the welders progressed so much more rapidly than was expected that there was considerable time lost while they waited for the rest of the organization to catch up. This condition was quickly remedied by reorganizing the pipe line crews so that the entire organization was geared up to the speed of the new welding process. Obviously, to obtain full advantage of the maximum speed and economy, the pipe line organization must be built around the welding gangs.

Women Lead in Buying

A RECENT survey conducted in various types of retail stores in New York City shows that women customers rank over men in drug stores in the proportion of 78 to 22.

Also, the theory that women do most of the buying even in men's wear is disclosed.

Following is the result of the survey of comparative purchases by men and women in 12 classes of retail establishments:

Type of Store	Percent of Purchases By Men	By Women
Drug store	22	78
Department store	18	82
Grocery store	19	81
Silks	2	98
Pianos	22	78
Leather goods	33	67
Automobiles	59	41
Hardware	51	49
Electrical Supplies	20	80
Men's stocks	25	75
Jewelry	10	90
Men's neckwear	37	63

Bumper Business

DURING the first eight months of 1931, more than 950,000,000 cubic feet of gas a year was contracted for by industrial and other firms in Alabama and Georgia. That, in a nutshell, is the story of natural gas development in two Southern states in which, two years ago, natural gas was almost unheard of. And it shows how Southern industry is keeping step with the best progressive ideas in business. Indeed, it is safe to predict that most of the Southern industries will be using gas for fuel in the next two years.

The largest users of natural gas in the Southeast will be the kaolin plants. Two of these—the Edgar Brothers, of McIntyre, Ga., and the Georgia Keolin Company, of Dry Branch, Ga.—have put in equipment to burn between them 710,000,000 cubic feet of gas during the next twelve months.

Another firm—the Oconee Clay Products Company—will burn more than 100,000,000 cubic feet of natural gas during the coming year.

While the Atlanta Plow Company, of Atlanta, Ga., will use 34,200,000 cubic feet of gas annually in its forges, core ovens and heat treating furnaces, the Alabama Pipe Company, of Anniston, Ala., will use 18,000,000 cubic feet in H. P. Inspirators and lava tips for ten core ovens, and the Agricola Furnace Company, of Gadsden, Ala., will use 10,800,000 cubic feet in its core ovens, conversion burner and water boilers.

Among the other types of industry which have installed natural gas during the past eight months are:—Apartment houses, aviation fields, candy manufacturers, dry cleaning establishments, dwellings, hosiery mills, hospitals, hotels, municipal buildings, printing plants, schools, woolen mills.

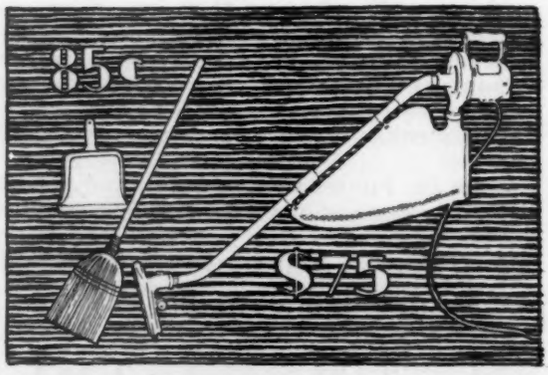
One of the largest installations to be made in the Southeast was put in for the Atlanta Federal Prison, in Atlanta, Ga.

Six bakeries located in Alabama and Georgia installed natural gas for ovens, doughnut machines, boilers and other equipment which will burn more than 30,000,000 cubic feet of natural gas during the coming year, while four printing establishments installed natural gas for heating, air conditioning, melting lead, operating linotype machines and many other purposes, and will burn more than 6,000,000 cubic feet.

One of the most unusual installations made by the Southern Natural Gas Corporation was at Griffin, Ga. Here the gas experts installed natural gas for a pimiento roasting oven of the Pomona Products corporation. The peppers, put green on one end of an endless chain, are roasted to a bright red when they appear at the other end and are ready then for packing. This installation will take approximately 22,500,000 cubic feet of natural gas annually.

In short—

There is scarcely a branch of industry in Alabama or Georgia, where natural gas has been piped, that has not made use of it in some way or other.



Bottled Gas as

H. S. BUNN

DAY in and day out, almost 15,000,000 housewives in suburban and rural sections of this country are cooking with wood or coal, kerosene or gasoline, on appliances which are essentially the same as those used for the past 50 years. Until comparatively recently there has been no other means open to them.

In the enthusiasm for new and dramatic labor saving devices we sometimes are apt to lose sight of the important fact that cooking food remains the primary and most important function in the home. The suburban and country housewives who are beyond the reach of city gas mains, however, have this condition constantly on their minds. They are reminded three times a day, 1000 times a year, that they are condemned to an old fashioned, laborious, unhealthy method of doing their biggest job.

Consequently they reach out eagerly for any means of escape. They invest large sums of money, those who can afford to, in gas-making machines, in fuel oil burners, and in electric ranges. Always there is the latent desire for the same convenience, cleanliness and comfort the city cousin enjoys with a modern, insulated, heat regulated gas range.

Bottled Gas Meets the Need

When all is said and done, GAS is the fuel women WANT for cooking. More women cook with gas than with all other fuels combined and this in spite of the vast amounts of smart, well directed sales and advertising effort to direct them to substitutes.

It was perfectly natural, then, that research be directed toward supplying in a portable form the kind of fuel that women want for cooking—GAS. The answer was found in propane, a hydrocarbon gas with a heating value five times that of manufactured gas, and of low enough vapor pressure to be readily compressed into easily portable steel cylinders. Where mains could not be laid, these steel containers could be delivered.

In order to use this gas, all that needed to be done was reduce the pressure to six ounces by means of an ordinary pressure regulator, run a ½" or ¾" pipe (using shellac at the joints) from the regulator in the cabinet back of the house to the range in the kitchen (see diagram). Any standard city gas range may be used with two minor adjustments.

a. Spuds of smaller orifice are inserted in the gas cocks to accommodate a gas of higher heating value.

b. The top burners are raised to within ⅞" of the cooking top to achieve the higher efficiency possible with a shorter flame.

The complete installation is simple as A B C, requires no mechanical parts, no expert knowledge to operate, and is perfectly safe. It is listed as standard by the Underwriters' Laboratories and does not affect the insurance rate.

Incidentally it will be noted that the cabinet houses *two* cylinders of gas, one for use and the other for reserve. Thus the consumer cannot run out of gas—when one cylinder is exhausted the reserve is turned on. A new cylinder is ordered and the gas delivery truck delivers it promptly and removes the empty.

So much for the mechanical phase of bottled gas service. Even though the device is practical, the question arises:

Will Women Buy It in Volume?

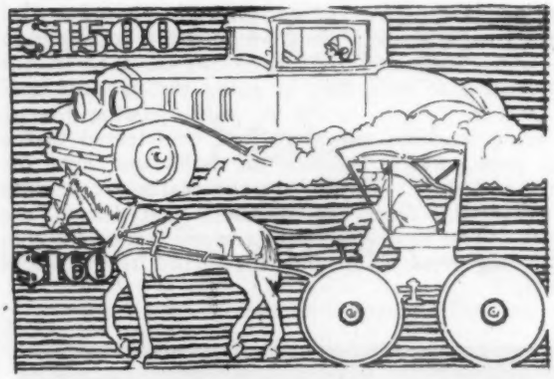
According to U. S. Department of Commerce women will buy *in volume* any device which makes their housekeeping easier, provided, of course, it is sold at a fair price and will deliver the goods. For example, glance at the list of common house appliances in current use today:

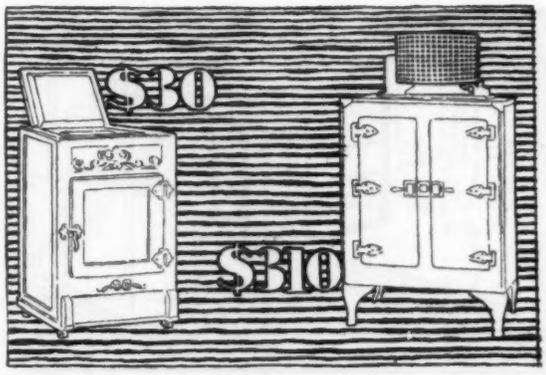
Appliance	Number in Use	Article Replaced	Times as Expensive
Vacuum Cleaner	8,200,000	Broom or Carpet Sweeper	10 to 40
Washing Machine	6,800,000	Wash Tub and Board	30 to 50
Gas and Oil Furnaces	500,000	Coal Furnace	2 to 5
Mechanical Refrigerators	2,800,000	Ice Box	5 to 10

The first impression one receives from these figures is the tremendous *quantity* of units sold. Then one is amazed at the premium the public is willing to pay for the added convenience.

The average cost of a bottled gas installation, including the range) is $90.00 to $150.00; about the price of a good washing machine. It is used 21 times or more per week against once for a washing machine. The cost of operation is no greater than with coal and not much more than with kerosene. Surely it should have a remarkable market.

It has. In this drab year of 1931, the bottled gas business has shown a steady increase in the number of users. The industry is now largely in the hands of a few large manufacturers, who are making a good product and marketing it through dealer organizations. The nature of the business is such that it is not susceptible to super-rapid development. Prospects are far apart, gas distribution by motor truck over large areas





a Trail Blazer

Pyrofax Division—Carbide and Carbon Chemicals Corporation, New York, N. Y.

must be perfected and a considerable amount of *educational* work must be done. Country people are not quick to accept improvements and must have definite proof of a product's utility before they buy.

The Place of the Gas Company in Bottled Gas

Apparently there is a direct connection here with the gas industry. Bottled gas manufacturers and dealers are promoting the "Cook with Gas" idea. They are doing it in territories where gas is unknown—the very territories into which the manufactured or natural gas industry will expand. It is generally true that the present user of bottled gas is the future consumer of the local gas utility.

At present the gas fraternity is taking a livelier interest in bottled gas than ever before and rightly so. Many forward looking executives are asking themselves what part they should assume in the development of this sister-enterprise.

The answer is not as simple as it looks. In a number of instances the utility company is serving most of the people it can logically expect to serve. There are few if any prospects in the immediate neighborhood to whom they could sell. Others are sufficiently taken up with merchandising appliances on their existing mains not to be able to assume a new and entirely different kind of specialty selling. Another group may not care to send representatives into the hinterland to secure business which will not be available as a gas main load for years to come.

There are three broad classifications of activity which gas companies may enter in the bottled gas field.

1. Cooperation with Existing Bottled Gas Distributors—Every gas utility should know what local merchants are handling compressed gas in their vicinity. They should know the quality of gas he handles, who makes it, and the type of delivery service rendered. They should be able *to tell any prospective consumer, no matter where he lives how he can enjoy gas convenience,* even though there will be no main extensions made in his neighborhood for years to come.

2. Act as Sales Agency for Bottled Gas Distributor—The next step in active cooperation is to display a compressed gas equipment on the show room floor. All retail salesmen can be instructed so that they are familiar with prices, appliances, terms, etc. The gas company can actually sell complete installations of equipment and appliances, turning the sale over to the local bottled gas distributor for installation and future supply of gas.

This type of cooperation is becoming widespread, for the gas company does not go beyond its normal function and yet it gains some revenue from the effort expended. Almost any bottled gas distributor will be glad to offer his local utility an arrangement of this nature.

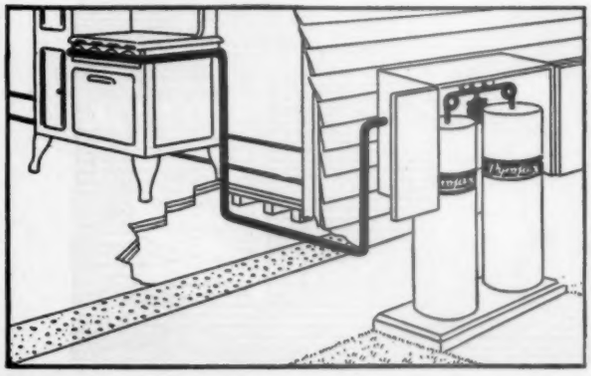
3. Assume Distributorship for Bottled Gas—It is also possible, of course, for the gas utility to take the full responsibility for the distribution of bottled gas in its territory, including sales, advertising and servicing. This requires, naturally, a complete, separate organization since the type of merchandising differs from that ordinarily followed. The same sales force will not operate in the city and country—the latter requires too much travel between prospects and the salesmen are bound to follow the course of least resistance.

Why Gas Company Is Ideal Distributor

There are several reasons why the gas company should be an ideal distributor for this service. First, it is "gas" and they are the local authorities on gas. Their name and good will would be great assets. Again, the utility is often able to offer more advantageous terms than the smaller merchant—and the proper time payment plan is of vast importance in the sale of bottled gas installations. The gas company can make its advertising 100% effective because it is then able to serve *every* reader. Experience gained in the buying and merchandising of city gas appliances would be useful in work with compressed gas.

On the other hand, the proper development of a bottled gas retail business requires specialization above all else. If it is a sideline, it is apt to die of dry rot. To enjoy a successful business necessitates clear appreciation of the factors of cost involved and hard, intelligent work by a specialty organization directed by a capable executive. Without these assets the gas utility has little chance of doing as good a job as an aggressive local distributor.

While it has been said that the use of cylinder gas has definitely increased, failure on the part of many manufacturers and distributors of cylinder gas to appreciate the highly specialized nature of the business and to carefully consider the factors of the cost involved has resulted in an unhealthy competitive situation in certain areas and rather widespread disappointment from the viewpoint of return on investment and profits achieved.



Bottled Gas House Connection

Bottled gas, in itself, however, is a vital and healthy development in the gas industry. It is decidedly an ally of the manufactured and natural gas division and, because of cost of distribution, can never become a competitor. By helping to accelerate its future expansion—which, by the way, nothing can stop—the gas utility is simply contributing to its own future growth.

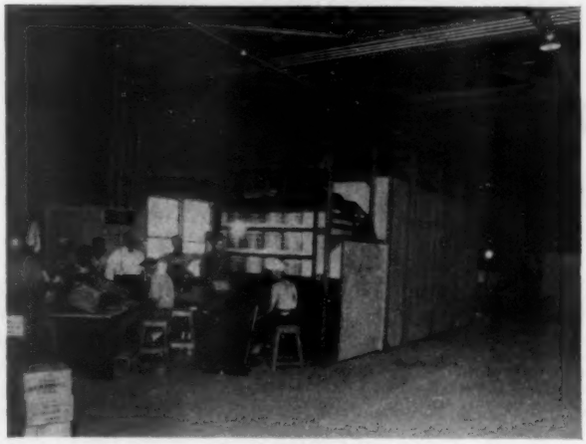
Bottled Gas Cooks Well

Gas Fired Enameling Ovens in Penitentiary

TWO gas-fired enameling ovens at the South Carolina State Penitentiary in Columbia have been installed for the purpose of manufacturing the Palmetto State's automobile license plates and road signs. These ovens are served by the Broad River Power Company, a part of the Associated Gas and Electric System.

Due to the fact that the penitentiary is located only two blocks from the Gas Plant, the Broad River Power Company gas engineers had very little difficulty in assuring the State authorities and consulting engineers dependable service and constant supply of gas for the successful operation of the plant. Other deciding factors in choosing the gas-fired ovens was uniformity of temperature control in the enameling process and the dependability and economy of gas equipment.

The plates are first cut and sent through the steel stamping department. They are made from 24 gage steel, 13 in. wide and are cut to 5⅝ in. x 13 in. It is interesting to note that in going through the gas-fired oven they shrink to 5⅜ in. After passing through a shearing machine, the plates are transferred to the punch press, which punches the holes and cuts the corners and slots. From here the plates are sent to the embosser. Then the numbers and letters are stamped. The next step is to run the plates through the rimming press, where they are further trimmed and finished.



View of Enameling Furnace

After going through the steel stamping department, the license tags are transferred to the conveyor type gas-fired oven. At this point the background is dipped in an enamel bath and slowly begins its journey through the drying and tempering oven. Once dipped in the enamel bath, the plates are subjected to a uniform temperature of 225 deg. Fahr. for a period of 1 hour and 15 minutes. At the expiration of this time the tags are removed at the opposite end of the oven, three sets of plates coming out on each of the revolving racks. After this initial drying process, the plates are passed to the numeral coating machine, which coats all letters and numerals with a green color contrasting with the gray background. They are then placed back in the oven and the baking is reversed for another hour and 15 minutes. The finished product is then checked and placed in envelopes and is finally sealed in boxes ready for distribution, with fifty sets of tags in each carton.

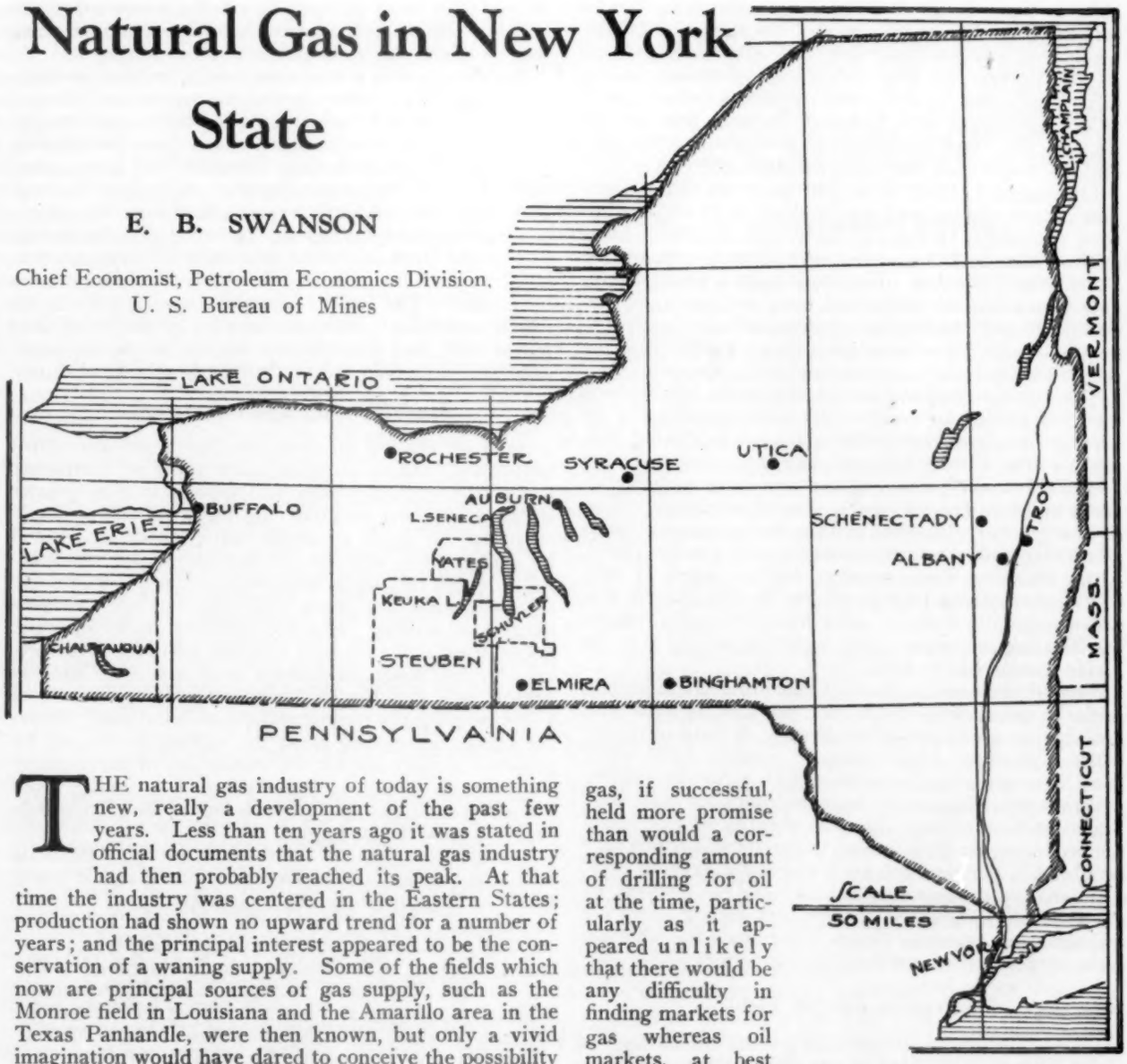
The large drying oven is of the conveyor type, having an hourly demand of 1,000 cu. ft. of gas. It is thoroughly insulated, equipped with all automatic devices and thermostatically controlled for any desired temperature.

The gas-fired oven for enameling road signs is of the stationary type. Equipped with all automatic devices it is also thermostatically controlled. Due to the fact that the road signs are much larger in size than the license plates, they are sprayed instead of dipped. Immediately after being processed, they are placed on racks and then wheeled into the stationary oven, where they remain until they are thoroughly dry and ready for the crating process. With all of the letters and numbers painted a contrasting color, they are then subjected to the oven for the final drying.

Natural Gas in New York State

E. B. SWANSON

Chief Economist, Petroleum Economics Division,
U. S. Bureau of Mines



THE natural gas industry of today is something new, really a development of the past few years. Less than ten years ago it was stated in official documents that the natural gas industry had then probably reached its peak. At that time the industry was centered in the Eastern States; production had shown no upward trend for a number of years; and the principal interest appeared to be the conservation of a waning supply. Some of the fields which now are principal sources of gas supply, such as the Monroe field in Louisiana and the Amarillo area in the Texas Panhandle, were then known, but only a vivid imagination would have dared to conceive the possibility of transporting gas from these fields very far beyond the borders of their respective States.

This situation continued until only a few years ago. Then, pipe lines were laid from the Monroe-Richland area of Louisiana to New Orleans, St. Louis and numerous communities in the Southeastern States; from fields in the Texas Panhandle and southwestern Kansas to Denver, Chicago and the Indiana border; from the Kettleman Hills to the San Francisco Bay area; and local service in the Rocky Mountain States was increased through the discovery of a number of fields. All of this led to a sort of national enthusiasm for natural gas which, like the early discovery of gas in Pennsylvania and the Findlay discovery in Ohio, had some influence on the natural gas industry of New York. The overproduction of crude oil, with its attendant lowered price scale, also was a contributing factor. The discovery of the Tyrone field resulted largely from the deliberate realization that drilling for gas, if successful, held more promise than would a corresponding amount of drilling for oil at the time, particularly as it appeared unlikely that there would be any difficulty in finding markets for gas whereas oil markets, at best were problematical. The discovery was not accidental. It marked the culmination of months of patient field work, of careful mapping and the study of all available records of earlier experience.

The Tyrone gas field, located principally in the township of that name in Schuyler County but extending also into Wayne Township in Steuben County and Barrington Township in Yates County, was discovered on February 26, 1930, with the completion of the Pulver No. 1 well, at a depth of 2,075 feet, initial open flow of 5,750,000 cubic feet and a rock pressure of 730 pounds. Two months later a second well, with initial open flow of 10,000,000 cubic feet, was completed, and five weeks thereafter the third well, with slightly more than 6,000,000 cubic feet initial open flow was reported. The field, named after the town of Tyrone in the northwest corner of Schuyler County, lies midway between Seneca and Keuka Lakes. The field also is referred to as the Wayne-Dundee and a dry hole near Altay, south of the field, when drilled, resulted in the designation of that particular section as the Altay field.

To the west of Tyrone is Wayne Township, in Steuben County, and to the north is Barrington Town-

Portion of a paper delivered at Annual Meeting, Empire State Gas & Electric Assn., Bolton Landing, N. Y., Sept. 11th, 1931. Printed by permission of the Director, U. S. Bureau of Mines (Not subject to copyright).

ship, in Yates County. Drilling extended from Tyrone into the two adjacent townships. On February 2, 1931, production was developed in Wayne with the completion of the Bigelow No. 1, at a depth of 1,747 feet, and an initial open flow of 8,900,000 cubic feet. On May 7, 1931, Barrington was included when a well on the Faucett farm was completed at a depth of 1,951 feet, with an initial open flow of 4,600,000 cubic feet.

On August 1, 1931, three-fourths of the initial open-flow capacity of the area was credited to 50 wells in Tyrone Township; 11 wells in the Wayne area were listed as producers, and two producers had been completed in Barrington Township. For the area as a whole, on the date mentioned, 63 wells had been completed as producers; 15 wells had either encountered water, were dry, or abandoned; 12 wells were drilling; 2 were being located; and operations on one had been suspended.

The acreage included within the producing limits is reported as slightly under 6,500 acres, resulting in an average of approximately 100 acres per producing well. Much of the drilling, however, has been concentrated in a relatively small portion of the field lying immediately north of Little Lake in the westward extension. Most of the territory included within the producing limits was under lease when the discovery well was completed. At the time data were assembled for this paper, 34 wells had been completed as producers in the limited area which originally was not under lease, while the remaining 29 producers were rather widely separated over the major portion of the field.

Such differences in spacing constitute an important factor in the ultimate production per well, as wells with drainage area reduced through close drilling obviously will not produce in total quantity equal to wells which have been spaced in accordance with a regular drilling program providing ample drainage zones for each well. Stated in another way, the total quantity of gas within the producing limits is limited to the amount which may be stored in the reservoir rock under the existing pressure. Active drilling does not increase the quantity of gas available within the structure, and drilling above the technical and economic limits will reduce the ultimate recovery per well within the competitive zone.

Indices of Life of Field

Neither the number of producing wells nor the aggregate initial open flow is a guide to the reserves or life of a field. The gas content of a structure is determined by its storage capacity and the pressure at which the gas is held. The number of producing wells and the aggregate initial open-flow capacity are indicators of the rate at which the gas may be extracted. The life of a field, consequently, is determined through dividing the available supply by the rate of flow. For example, the gas resources of the Tyrone field have been estimated at from 12 to 18 billion cubic feet, or 2 to 3 million cubic feet per acre, and could not be expected to produce gas at the rate of its aggregate initial open-flow capacity for a period much longer than a few months; and continued production over a ten-year period would necessitate limiting the daily rate of production to a very low percentage of its open-flow capacity.

Production in the Tyrone field is from the Oriskany sandstone, encountered in the discovery well at a depth of 2,075 feet and, in subsequent drilling, at depths from 1,674 to 2,177 feet, according to the location of the drilling and the surface elevation. The gas from the Oriskany in the main part, or Dundee section, of the Tyrone field contains some hydrogen sulphide, removed before the gas is utilized, while the gas in the westward extension is "sweet" and requires no treatment, indicating that the producing zone may not be continuous.

The Oriskany is a thin sandstone intermittently separating the Salina waterlimes at the top of the Silurian, and the Onondaga limestone at the bottom of the Devonian Age, or sometimes separated from the Silurian by a few feet of Helderberg limestone. It is irregular, both as to thickness and density. Along its outcrop, west from Onondaga, it appears intermittently, disappearing completely at times. Torrey credits the formation of the Oriskany to the deposition of the sandy material washed down during the elevation of the eastern land mass. The region was then occupied by a sea which was being pushed to the west by the rising land to the east, and what is now known as the Oriskany sandstone was then the sand of its beaches and dunes.

Sand Porosity and Gas Storage

Sand on the sea or ocean beaches is not laid down uniformly. Ocean currents may wash it completely away from certain places and deposit it with greater thickness at other localities and the wind will similarly rearrange the sands above the water level. There will be a separation between the fine and coarse material. All of these variations, seemingly, are present with the Oriskany sand and more than duplicate the ordinary hazards of drilling. It is not sufficient, under such circumstances, to locate and drill an adequate structure, but the drill must penetrate a zone where the sand is present with sufficient thickness and porosity to serve as a storage place for commercial quantities of gas. Structures may be mapped from the surface or located by geophysical methods, but the technicians of the industry have not yet developed a method of determining, from the surface, the porosity of sands buried some thousands of feet below the surface.

Torrey* says that the Oriskany is probably the least continuous of any of the Devonian rocks, and at many localities its position in the geological section can only be inferred. At the type locality it can not be followed for any great distance and west of this place typical outcrops are rare. The Oriskany, as developed in central and western New York, he states, probably represents submarine bars which were not subject to swift ocean currents or which mark the shore line of the sea during a temporary suspension in the advance of the water. Elsewhere, or in those places where the Oriskany is not evident, the transgression of the sea was seemingly so rapid that accumulations of sand did not occur; or, if formed, they were removed and washed away by subsequent changes in the position and outlines of the sea. He therefore concludes that careful studies of Oriskany sedimentation are as essential to the successful location of new gas fields as is the mapping of the anticlinal structure.

Production Below Demand

Natural gas is not produced in New York in quantities sufficient to supply the demand, and quantities in excess of local production have during recent years been received from Pennsylvania. During 1930, however, production within the State was slightly greater than the

*Torrey, Paul D., "Natural Gas from Oriskany Formation in Central New York and Northern Pennsylvania." Journal, A.A.P.G., June, 1931, pp. 671-688. Same—"Geology of the Natural Gas Fields of New York State." Bull. 9, Mineral Industries Experiment Station, The Pennsylvania State College, 1930, pp. 88-110.

amount transported from Pennsylvania. Natural gas production in New York increased from 8,387,000,000 cubic feet in 1929 to 9,624,000,000 cubic feet in 1930, the highest production recorded for the State during any year. The quantity received from Pennsylvania dropped from 10,011,000,000 cubic feet in 1929 to 9,478,000,000 cubic feet during 1930. Consumption increased from 18,192,000,000 cubic feet in 1929 to 18,991,000,000 cubic feet during the past year, not including the relatively small quantities exported to Canada. Approximately 90 per cent of the consumption is for domestic purposes, field use and industrial distribution being relatively low.

Depending upon natural gas from Pennsylvania for approximately half of its supply, New York has a direct interest in the recent developments of the adjoining State, especially as the major portion of the distribution from the new Farmington field probably will serve new consuming areas within New York boundaries.

The Oriskany also is the producing sand of the Farmington field on the Sabinsville anticline in Tioga County, Pa. Remembering the dip to the south occasioned by the shelving sea bottom previously mentioned, the Oriskany is, as expected, some 2,000 feet deeper in the Pennsylvania field than in the Tyrone region, and the rock pressure, increasing normally with depth, is in the neighborhood of 1,600 pounds. The Oriskany in the Farmington field is credited with a thickness of approximately 50 feet, as compared with from 15 to 20 feet in the New York area. The greater thickness of sand and the higher rock pressure makes possible the storage of considerably more gas per acre of producing territory in the Farmington than in the Tyrone field, although this may be offset slightly by a narrow difference in porosity.

The Farmington field was discovered in September, 1930, with the completion of the Palmer No. 1, with initial open-flow capacity estimated up to 20,000,000 cubic feet. This discovery was followed by the Ben Meeker well, the open flow of which was estimated initially at 80,000,000 cubic feet and, more recently, by the M. P. Close well, with initial open flow estimated at 70,000,000 cubic feet. At the middle of August, 16 producing wells had been completed. At the same time, 22 dry holes had been drilled.

The excess of dry holes over producers in the Farmington field has resulted partially from the fact that much of the drilling was exploratory, with the view of determining the field limits, and also to an important extent, from differences in the density of the sand within the structure. Dry holes have been drilled on the structure within a relatively short distance of producing wells, finding the Oriskany sand extremely dense. It appears that the structure is complicated further by the presence of a fault line within the field.

Oriskany Sand Not of High Porosity

The Oriskany sand does not appear to be one of high porosity. Tests made by Dr. Charles R. Fettke, professor of geology, Carnegie Institute of Technology, of nine samples taken from three producing wells showed pore spaces ranging from 4.0 to 10.4 per cent, the average of the nine samples being 6.6 per cent. Dr. Fettke* states that it hardly seems possible that a sand of as low porosity as that of the fragments tested could yield such large volumes of gas as flowed from the wells at the time they were drilled in and suggests the possibility that secondary cavities may have been developed in the sandstone by fracturing along the anticlinal axis or that the sandstone in places may be intersected by shear or fault zones and that the secondary openings developed in it in this manner afford the chief reservoir for the gas rather than the original pore spaces between the sand grains themselves.

**Fettke, Chas. R., "Subsurface Studies in the Tioga Region, Penna." Supplement to Bulletin No. 102, edition of April 17, 1931, Topographic and Geologic Survey, Commonwealth of Pennsylvania.*

Results of Exploratory Drilling

The Fir Tree Point anticline, adjacent to which the Tyrone field has been developed, and the Sabinsville anticline of the Tioga region are but two of a number of anticlines in New York and Pennsylvania along which possible producing areas have been mapped. The Wellsboro anticline, immediately south of the Sabinsville, has received considerable attention, at least seven wells having been located at various points in its vicinity. It is reported that test wells also have been located along several other anticlines and synclines in the general region of the recent production. None of this exploratory drilling has, as yet, been successful in locating additional producing areas, but, remembering what has been said of the erratic nature of the Oriskany sand, it cannot be said that these failures to achieve production definitely condemn all of the regions which have been partially tested.

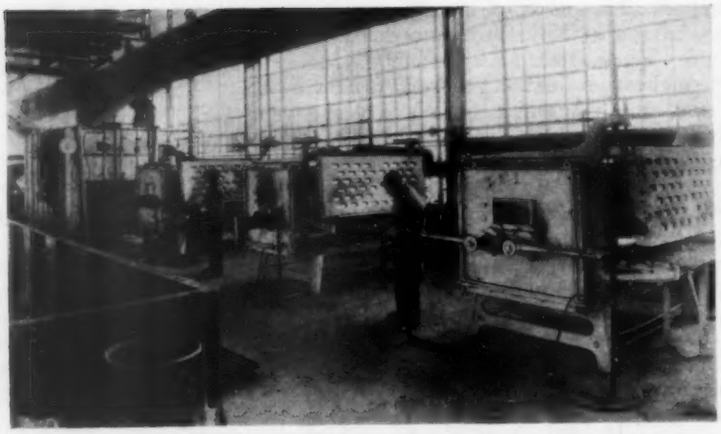
Several structures, located and leased in the course of the field surveys which preceded or accompanied the development of the Tyrone and Farmington fields, have not as yet been tested. The general thinning of the sands toward the east and the presence of the anthracite region to the south are factors which make uncertain the prospect of favorable development in those directions. It is interesting to note that one well in the Tioga region, which was dry in penetrating the Oriskany, has been continued downwards with the purpose of exploring the possibilities of the Medina, nearly 3,000 feet deeper in the geological column. According to recent report, this well had exceeded a depth of 7,000 feet. The Medina also is the reported objective of renewed drilling in Chautauqua County. The Trenton limestone also is as yet untapped by wells in this region.

The recent discoveries in New York and Pennsylvania have attracted considerable interest because, in respect to previous performance in the eastern fields, their records have been spectacular. The development of any new gas reserves in these oldest producing territories is of different economic aspect than the discovery of equal or larger production in more distant regions. Viewed solely as to the field value of the gas, discoveries in New York are, for fields of comparable size, considerably more important than discoveries in the Southwest. An average field value of 33.2 cents per 1,000 cubic feet was reported to the Bureau of Mines for New York in 1929 and 27.6 cents for Pennsylvania as compared with 3.3 cents for Texas, 6.6 cents for Oklahoma and a national average of 8.2 cents. Values for 1930 are comparable on a similar basis. This high field value in New York and Pennsylvania results partially from the more direct relationship existing between the production of gas and its consumption and a higher cost of production, but it also results from the economic advantage of location—the proximity of the eastern production to consuming areas, as compared with gas which would have to be piped from more distant sources.

(Continued on page 72)

Industrial Furnaces for Gas

Part IX "Small Forge Furnaces"

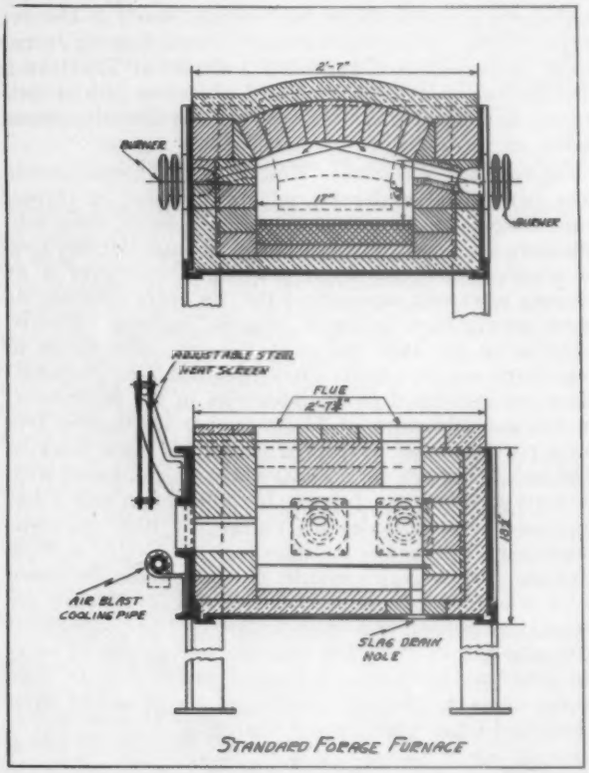


Battery of Forge Furnaces for Auto Crankshafts

LAWRENCE E. BIEMILLER

Supervisor, Fuel Sales, Consolidated Gas Electric Light & Power Company of Baltimore

SMALL forge furnaces are used where the number of units to be forged does not justify large continuous furnaces and where the size of the forgings to be heated does not necessitate a large non-continuous furnace. With forge furnaces the line of demarcation between standard and special furnaces is not so clear as it is in the case of oven furnaces. Heretofore standard furnaces have been more or less of one distinct design, and special furnaces of the same class, much larger and rather different. But with forge furnaces special furnaces, rather different in design, come in very small units. This article aims to discuss the usual small forge furnace, and to show its similarity to the most important types of small special forges, often encountered. A good understanding of this latter type of furnace is particularly desirable for it is with it that the flexibility of gas fuel is easily demonstrated and appreciated.



STANDARD FORGE FURNACE

Small Forges for Tool Dressing

The small forge pictured is very well adapted to general tool room use. It is equipped with sufficient burner capacity to quickly heat the material to be forged, and is equally well adapted to tool dressing, hardening, annealing and brazing. It is equipped with openings exactly alike, in both the front and the rear, so that the material to be heated can be put in from either end, or can extend through front and rear openings and be heated in the center of its length. This furnace has no other flue, so at least one of these ends must be left open sufficiently to serve as a flue. It is also used for heating small parts such as are drop-forged in the cutlery industry.

This furnace is supplied with a heavy refractory lining of hard-burned fire clay, but no insulation is used. Since this furnace has large openings the percentage of the heat which could be saved due to insulation is very small. It is therefore economical to sacrifice this heat saving in the interest of long refractory life and quick heating up. Two burners fire from opposite sides, one above, and one below the hearth. Air at one pound and gas at a few inches are mixed by means of an injecting tee, which results in proportional mixing over a partial turndown. Such a forge with inside heating chamber dimensions 10 by 12 by 2½ inches has a burner capacity of 250,000 B.t.u. per hour.

Small Special Forges

A very usual type of small special forge is the end heating forge pictured. It is used for heating blanks on one end in the manufacture of files, cutlery, screw drivers, small chisels and the like. As will be observed, the outstanding characteristic of this furnace is the long narrow slot opening. There is a frame work in front of this slot to hold the ends of the bars. A number of pieces are put in the furnace, inserted just to the desired extent and heated; after which they are removed singly and worked under the hammer, a new piece being replaced every time one of the heated pieces is removed.

Like the small forge, and for the same reasons, this furnace has a hard burned fireclay refractory and no insulation. It is underfired by a number of burners at

Small Forge—for tool dressing

both the front and the rear. It has a flue on one side, the opening of which is controlled by the position of a firebrick plug. The available heating space is 19 by 6 by 1½ inches, and the entrance slot is 20 by 2 inches. The burner capacity is 190,000 B.t.u. The top of this furnace is removable, and any part of the refractory lining can be readily replaced in a minimum of time.

This end heating forge is characteristic of a type of furnace for heating a specific portion of a large piece of metal, so that only that portion will be worked. Pipe bending furnaces and tube bending furnaces are really modifications of this same type of special forge.

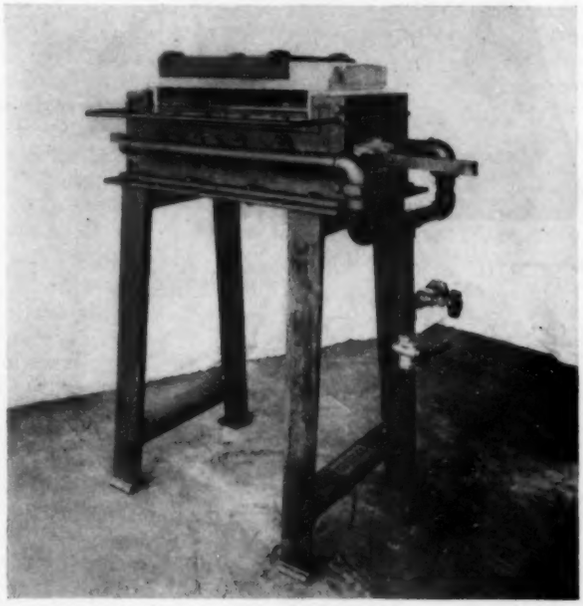
Standard Small and Medium Forges

The standard forge, of which a cross-sectional sketch is here given, is extensively used to heat stock for steam and drop hammers, and forging machines. These furnaces are made in sizes with heating chambers from 17 by 7 by 6 inches, to 41 by 12½ x 24 inches. They are of sufficient size to justify insulation, and 2½ inches of sil-o-cel insulation is used, with 4½ to 7 inch firebrick lining.

The furnace of which the cross-section is here given has 4 burners, two on each side, staggered, directing their flame toward the arch. The total burner capacity is 360,000 B.t.u., and the furnace can be heated to 2200° F. in one-half hour, after which it can be held at this temperature when using 90,000 B.t.u. per hour. An air blast cooling pipe located in front and beneath the slot serves to blow the intense heat upward and to some extent to reduce the furnace losses through the slot. An adjustable steel screen serves to reduce the effective slot opening, to reduce the glare and to shield the furnace operator. This furnace has a proportional mixing burner system, which either uses gas at 10 to 20 pounds to inject the air, or air at one pound to inject the gas after it has gone through a zero governor.

General Considerations

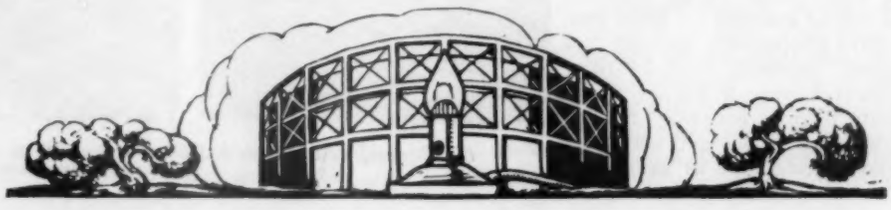
The same general type of forge with openings on both ends, however, is used for the heating of springs. Small forges are also made with the material being carried through it by mechanical means, where the number of parts to be forged justifies. Some of these will be as little as six feet long with the material carried through on a conveyor. Another type will be perhaps 12 feet long, but only 6 inches in width and 1½ inches high, and have the material pushed through. This is the same principle of furnace design and material handling used in large special furnaces.



End Heating Forge

Small forges have not been very extensively equipped with automatic temperature controls due to the variety of material put through them and the short and differing heating periods. Where special conditions justify, it is practicable to obtain automatic control to plus or minus 5 degrees F.

Gas has been extensively used on the smaller forges herein discussed, where the convenience and ease of its use is particularly valuable. Oil is often used on larger forges where the scale resulting from the use of oil is preferred. To date electricity has not been used much in the field of small forges, because of the difficulty of securing a satisfactory life from metallic heating elements used at forging temperatures.



Air Cleaning Devices

The Theory and Application of Wet or Viscous and Dry Air Filters in Forced Warm Air Heating Systems

W. E. STARK

Research Engineer,
The Bryant Heater & Mfg. Company.

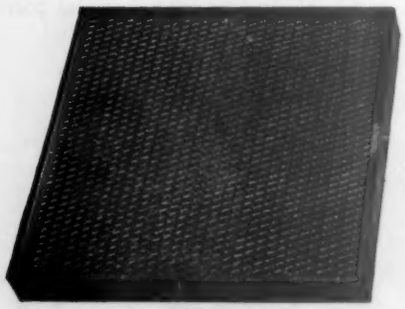


Fig. 1 — Typical Viscous Type Filter Cell

Courtesy Warm Air Furnace Fan Co.

THE modern forced warm air heating system generally possesses two attributes that distinguish it from the gravity warm air heating system of a few years ago. It possesses, in addition to positive means of air circulation positive and sometimes controllable humidifying equipment, and air cleaning equipment. Humidification can be accomplished in a gravity system, but if air cleaning is to be accomplished, positive fan circulation is necessary to overcome the rather considerable resistance set up by the necessary equipment.

The purpose of an air cleaner is to remove from the air stream the solid dust particles that are readily carried from place to place in a moving current of air; to be deposited either due to gravity when the air stream suffers a reduction of velocity, as when it enters the space being heated, or due to impingement of the air stream on solid objects such as furniture, draperies or walls. Dust, as encountered in domestic premises, is in general of two varieties. First: there are those dust particles which are heavier than air. Although they are sufficiently light to be carried in a moving stream of air, they will eventually settle out by gravity and tend to be removed by impact, centrifugal effect, or by settling out of a quiet mass of air. Second: there are those dust particles which are so light that they cannot be removed by gravity, but must be removed by impact on suitable surfaces or by filtration. Dr. Drinker has referred to these particles as "fume."

In addition to dust, there is smoke, practically incapable of removal in its entirety. Although visible smoke consists of solid particles, they are ultra-microscopic and are not capable of complete removal, even by filter paper. Smoke behaves very much as a gas does. Air cleaning devices generally remove only the heavy carbon particles and condensible vapors that are constituents of smoke.

Air cleaning devices as used in furnace heating installations are of two varieties:

1. Air filters
2. Air washers

Air filters can be further classified as

(a) Wet (or viscous) filters
(b) Dry filters

As a matter of fact, so-called air filters are not filters at all. They function primarily by impact; the wet filters by impact on viscous or sticky surfaces, and the dry filters by impact on dry surfaces. They are strainers or dust catchers, rather than filters in the sense that filter paper is a filter.

Viscous Filters

Probably the first air filter used in furnace work was a simple cloth screen, such as cheese-cloth or coarse muslin. Such cleaners stop large dust particles, but if made fine enough to stop the small dust particles they are certain to become clogged and practically impenetrable by the air stream. Constant cleaning and replacement is necessary with such an air cleaner.

The human nostril is the progenitor of the viscous type air filter. The short hairs, not particularly closely spaced, but quite effectively staggered and kept constantly moist by the nasal secretions, form a very effective air filter. This filter functions by impingement on an adhesive surface.

Dust in city air, and soot and carbon as well, are effectively caught when the air stream impinges on a surface with a viscous coating, such as a coating of oil. In order to secure maximum efficiency, the air must be divided into many fine streams, and each fine stream must be caused to impinge a number of successive times on a viscous coated surface. The first impingement of air on a surface with a viscous coating has been found to remove about 60 percent of the dust and dirt. The next impingement removes 60 percent of the remaining dirt, and so on. Thus, it can be seen that theoretically, five consecutive impingements should remove 99 percent of the dust. Actually, there is as yet no complete agreement on the proper method of testing air filters for dust removal, so that the per-

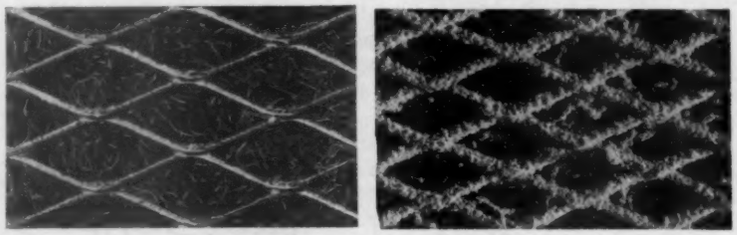


Fig. 2—Surface of Clean and Dirty Viscous Type Filter Cells
Courtesy Warm Air Furnace Fan Co.

formance cannot be determined to as close a degree as would be indicated by 99 per cent dust removal.

In the practical case, air filters operating by successive impingements on viscous coated surfaces have been worked out for domestic warm air furnace applications by the use of a bed of steel wool retained between two screens formed of expanded metal. The whole is bound together in a suitable frame and then receives a thorough treatment with the viscous oil. The standard thickness for domestic furnace work is two and one-half inches.

As the dust and dirt particles are taken up by the oil coating on the fibres of steel wool, the oil is replenished from the innumerable fine droplets that coalesce at the crossings of the steel wool threads. Oil spreads from these minute reservoirs as the dust coating forms on the wool, thus preserving the viscous character of the filling for a considerable period.

Such a filter needs periodical servicing which is administered by hosing the filter off with hot water. To do a thorough job, a nozzle must be used on the hose and the stream initially applied to the side on which the air strikes, thus loosening the dust accumulation which is then washed away by directing the stream against the other side. After drying, the filters are rendered ready for service by dipping in the proper oil, followed by draining. The entire operation consumes but little time. Frequency of servicing depends altogether on the character of the air passing through the filter. Annual servicings are adequate in some localities; while bi-monthly servicings may be needed elsewhere. The age of the house is a factor. Old houses are more dusty than new ones.

For large scale air cleaning, beyond the residence class, viscous type air filters are made in the automatic type. The filter elements may be arranged in the form of an endless screen, suspended vertically in the air stream and made to revolve slowly by suitable sprockets and other mechanism. The lower portion is suspended in a reservoir containing the viscous fluid. As the screen rotates slowly through the viscous bath, the collected dirt is flushed off and the screen given a fresh coating of the viscous fluid. In another type of automatic filter, the screen is stationary and is automatically flushed off at intervals, the fluid being pumped to an overhead tank and then allowed to flow down over the filter screen, carrying the collected dirt along with it. For domestic use, the filters are made in two standardized sizes, in the form of twenty by twenty inch or twenty-five by fifteen inch cells. All makes seem to be made in these sizes, a feature of considerable importance to filter users.

Dry Filters

Of more recent origin than the viscous filter and seemingly a throwback to the crude cheese cloth screen, is the newer dry filter. Instead of cheese cloth, muslin, or similar material, a cellulose filter mat is employed. The material resembles a porous and absorbent paper. This type of filter, as well as the viscous filter, operates on the impingement principle, at least during the early part of its period of use. It is well known that such filters attain their greatest effectiveness after they have collected a thin coating of dusty material, following which preliminary period they approach nearer to true filters in their action.

The filter mat is applied in various manners. In some cases the material is arranged on the opposite surfaces of narrow hollow pockets, a number of which pockets are then arranged side by side in a suitable cabinet, spaced apart. The air in effect enters the pockets, passes through their porous side walls, and then out between the pockets. The individual pockets or cells are removable and the filter material is capable of easy replacement. In another type the filter material is arranged in corrugated or accordion form within the individual cells. In either event the general object of the arrangement is to get the maximum amount of filter surface within the maximum amount of space. Servicing consists of replacing the soiled filter mat with a new one. For those filters in which the pockets are placed side by side, the filter material is arranged in accordion-like folds within the individual cells. The material is supplied in folded and compressed bundles, ready to be elongated and placed on the cells.

Cleaning by Impingement

Another variety of dry air filter that has seen some use in domestic work consists merely of two tightly stretched layers of burlap, arranged to form a cell about one and one-quarter inches thick, with the outer surfaces protected by wire screen of quarter inch mesh. Such a filter cleans by impingement, particularly during the early days of its use. It secures its full effectiveness only when the threads of the burlap and the many projecting fibres pick up a film of fibrous dust particles which form a sort of filter mat over the larger interstices in the burlap. This filter is cleaned merely by rapping sharply to jar off the accumulated dust.

Still another dry filter is made up of large parallel threads of jute laid parallel and forming the warp of a screen of which fine wire forms the woof: This jute screen provides a suitable surface to collect larger dust particles by impingement. Adjacent to the screen of jute threads and placed so that it is next in the path of the air is a closely woven cloth screen which collects the finer dust particles. The entire assembly of jute and cloth screens is folded accordion-wise and retained in a standard sized cell. Cleaning is done with a vacuum cleaner, using an upholstery nozzle. With some types of dry filters, particularly those incorporating burlap in their construction, cleaning is done by rapping or vibrating.

Every element considered, a comparison between viscous type filters and dry filters places them on a very nearly equal basis. The viscous filter seems to be lower in first cost than the dry filter, while the maintenance of a dry filter, particularly if the filter medium is removable, is a little simpler. Probably the resistance of a dry filter builds up a little more rapidly under dust accumulation than does the resistance of a viscous filter.

In determining the fan and motor requirements of a forced warm air system, the static resistance offered by an air filter is an item of particular importance to the furnace or system designer. Sufficient filter area must be provided to insure sufficient dust holding capacity to obviate too frequent servicing, and at the same time to keep the velocity through the filter, and consequently the static resistance, to a low value. The curve, Figure 3, shows the static resistance of a representative viscous type filter made for domestic furnace work, the base of the curve being the cubic feet per minute per standard twenty by twenty or sixteen by twenty-five inch cell. The gross face area of such a cell is 400 square inches, while the net face area, with deductions for cell frame, is about 360 square inches.

The resistance shown in the curve is the resistance of a clean filter. In this type of filter the resistance builds up very slowly at first and more rapidly as the dust holding capacity of the filter is approached. Increasing

resistance, of course, reduces the amount of air handled by the fan, although the rate of reduction with increasing resistance depends altogether on the characteristics of the fan. Manufacturers of viscous filters recommend that one filter cell be used for every 500 cubic feet per minute air delivery.

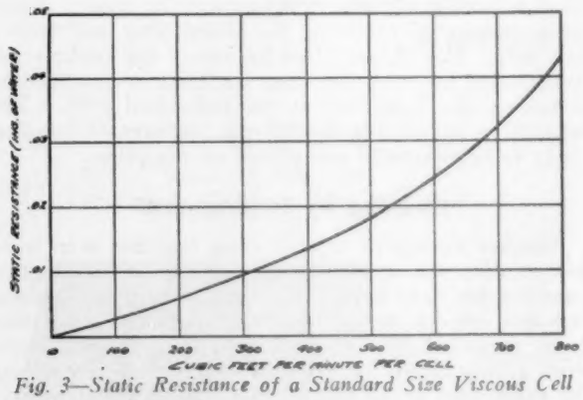


Fig. 3—Static Resistance of a Standard Size Viscous Cell

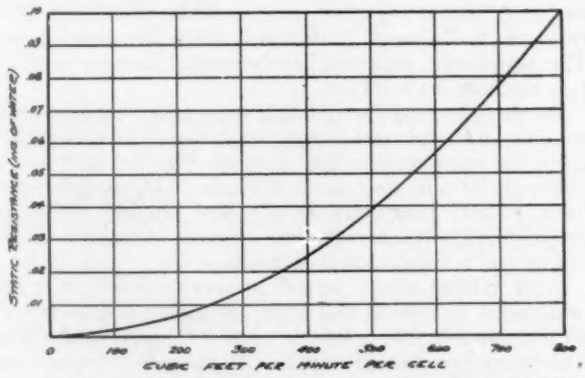


Fig. 4—Static Resistance of a Standard Size Dry Cell

Figure 4 shows the maker's figures for the resistance of a representative dry filter using removable cellulose filter medium, again for a standard sized cell.

Automatic viscous type air filters in which the viscous medium is continuously circulated by means of a pump over plates on which the air impinges are on the market for domestic use. They are available with capacities from 800 to 5800 C.F.M. It would seem, however, that such a filter introduces a rather unwarranted amount of complication into the solution of the rather simple problem of domestic dust removal.

Although the air-washer is primarily a humidifying (or de-humidifying) device, and for large scale applications has been almost completely superseded by the air filter for air cleaning purposes, it is, nevertheless, applicable to air cleaning problems and is available for domestic applications. It consists essentially of a bank of spray nozzles so disposed that they provide a screen of spray or mist through which the air must pass, followed by a series of baffles or eliminator plates which are for the purpose of removing the droplets of water that may be held in suspension in the air stream. Although the air washer removes a certain amount of dust and dirt from the air, the rather simple types practicable for domestic use are not comparable with the air filter in cleaning efficiency.

Natural Gas in New York State

(Continued from page 67)

With the development of large reserves in Texas and Kansas, the range of natural gas distribution has been extended until even the movement of Texas gas by pipe line to the Middle and North Atlantic regions has been suggested. Lines extending eastwards from the southwest fields have approached the older lines of the Appalachian region. Lines now reported under construction or contemplation from the Farmington field will extend southwards in the direction of the older systems and, in the opposite direction, across the New York border. Should ample reserves be developed, further extension in a northeasterly direction might be possible. There is noted, consequently, a tendency to merge the gas resources of the Appalachian area with those of the Southwest in supplying the present and potential markets for natural gas in the northeastern United States. The production developed in Tioga and Tyrone regions undoubtedly has contributed to this future possibility by permitting the immediate entrance of natural gas into certain districts which later might have come within the scope of the extended distribution from the Southwest.

Acknowledgments

The references to the geology of these regions have been abstracted from publications of the Pennsylvania Topographic and Geologic Survey and the New York State Museum and from the two articles by Mr. Torrey previously mentioned. Operators in both fields contributed freely all of the operating data necessary for the purposes of the paper. This assistance is acknowledged gratefully.

Summary of the Situation

In summary of the situation, then, it may be said that the natural gas industry of New York State, 110 years old, recorded its greatest production during the past year. The recent discoveries are of considerable economic importance, but these developments should not be taken to indicate that reserves similar in size to those of the Southwest have been developed or that natural gas will be available for consumption at the low rates prevalent in the fields of the Southwestern States. It should not be assumed that similar fields may be discovered easily in other portions of the two States or that the ability to drill a single well will be rewarded. Enough has been said of the difficulties encountered in recent developments to indicate that considerable patience, energy and skill will be needed in the search for new fields. Development work undoubtedly will be continued and structures which have been located probably will be tested. At present it does not appear probable that a supply will be developed within the State in sufficient quantity to render New York independent of natural gas from outside sources.

An Up-to-the-minute Gas Building

THE largest building in the Southwest devoted exclusively to the natural gas industry, was opened recently in Dallas, by the Dallas Gas Company.

The twelve-story building is of black granite, stone and brick, executed in a modernistic style with set-back architecture. It was designed especially for a gas building, and will accommodate equipment and employes to handle the 70,000 customers' accounts of the company. Foundations were laid to add ten more stories, should the business of the company so justify at some future date.

Two bronze revolving doors, one from Jackson street and one from Harwood, lead into the customers' lobby. The first floor is decorated in black marble, bronze and cream-colored stone with a high beamed ceiling wiped out in brilliant colors.

On the first floor is a wide lobby with two bronze check desks for the convenience of patrons, and the departments for applicants, payment of accounts, duplicate bills, and service estimates. Automatic tubes connect with other departments for quick transmission of messages.

Modern Appointments

A special arrangement has been made for deposit of payments of accounts after the offices have been closed. This is located in the elevator lobby of the building.

Offices for adjustments, credit department, billing, bookkeeping, addressing, filing and collection are located on the second floor. Here, the walls and ceiling have been treated with a sound-deadening composition to reduce vibration and noise.

The third floor will be occupied by the accounting department, the gas distribution department, drafting room and chart storage. J. W. Everman, City Supervisor of Public Utilities for the City of Dallas, will have an office on this floor for the use of his department, as required in the company's franchise.

Silica Gel Air Conditioning System and Boilers—All Gas Fired.

New Building of Dallas Gas Company

On the floors above the third will be offices for the officials of the Dallas Gas Company, the Lone Star Gas Company, the Municipal Gas Company, the Community Natural Gas Company and the Texas Cities Gas Company. Here, too, will be located the engineering, geology, legal and gas measurement departments. The advertising department of the Lone Star Gas system will be on the sixth floor.

An auditorium for cooking schools and gas demonstrations, surrounded by a roof terrace, will occupy the eleventh floor, which is devoted to employes' club rooms, stage, motion picture screen and projector for entertainment and educational purposes, and a kitchen.

A black marble stair leads from the main lobby on the first floor into a downstairs lobby of Spanish architecture with beamed ceiling in antique colorings. To the left of the stair are four rooms completely furnished, displaying new models in gas apparatus for laundry, living room, kitchen and bath. These rooms open on an outside scene painted by a prominent artist from Dallas, and are lighted by artificial sunshine.

Other Features

To the right of this stairway is a women's rest room for customers, with maid in attendance. The downstairs reception room provides a space for cooking demonstrations and a display platform for modern gas appliances.

A cooling system is located in the basement which will serve the downstairs lobby and the customers' lobby on the first floor.

A cafe is located adjacent to the elevator lobby, which is open to employes of the gas company, as well as the public. All equipment used in this cafe is operated with gas.

One of the features of the construction is that it is made almost entirely of products made in Texas, the majority of the materials entering into the construction coming from within a 100-mile radius of Dallas.

AMERICAN GAS MERCHANDISING ALMANACK

November

NOVEMBER is the month of the topaz, the pumpkin, the chrysanthemum—the month of brisk days for the lover of out o'doors, football and trips to the woods. November days whet the appetite and bring thoughts of home baked goodies. November brings Armistice Day and Thanksgiving. November is a good month to sell gas ranges, griddles, waffle irons and gas toasters—all load builders. These sales may be month-over sales or specials for one day or one week; they all may be played up with store demonstrations of a special nature, on discount days, etc. Folks will linger and listen and look and buy when properly approached during November.

November as we view it, is a truly GAS month and if planned selling is carried on, should be one of the most profitable load building and appliance selling months on the calendar.

Window display advertising also gets a greater amount of circulation during November than it does during the warm months of summer or early Autumn. Windows may be designed to feature any of the appliances we have mentioned or they may be tied into Armistice Day, Thanksgiving Day, and in some localities, into Election Day. Seasonable settings may also be arranged; settings that symbolize not only the season but the uses of the appliances displayed. Color schemes may be those of nature.

Window cards may tie-in with such messages as: "Vote for Better Cooking," "Yours for a Real Thanksgiving," or "What is Better than Hot Buttered Toast," etc., etc. Where the local eleven plays, school colors may be used in connection with a range window which "Insures Mother a Perfectly Cooked Dinner Even Though She Does Attend The Game."

1—Sun.	All Saints Day. **Have everything in readiness to open your gas range sale tomorrow morning.**
2—Mon.	**Gas range sale starts. Have windows in order, stocks priced, literature at hand and hold a meeting with your sales force.**
3—Tues.	Election Day in some localities. **Build special display for the day if there is a spirited contest or football game of general interest.**
4—Wed.	Gatling gun invented, 1862. **Check up with your sales force to see if they are giving prospects a rapid fire canvass or an actual "What it will do for you" sales talk.**
5—Thur.	American Revolutionary troops disbanded, 1783. **Day for store demonstration. Send advertisement to newspaper for publication in Food Section of daily newspaper tomorrow.**
6—Fri.	New York adopts woman's suffrage, 1917.
7—Sat.	Battle of Tippecanoe, 1811. **Check-up on duties for next week.**
8—Sun.	Montana admitted to Union, 1889. **Run advertisement in daily newspaper.**
9—Mon.	First settlement in Connecticut, 1635. **Have special demonstration in store.**
10—Tues.	Americans capture Montreal, 1775. **Send out special literature to picked prospect list.**
11—Wed.	**Go over plans for new window display advertising. Hold meeting with sales people.** Armistice Day.
12—Thurs.	Elizabeth C. Stanton, reformer, born, 1815, Frederick Accum published first treatise on gas, 1815.
13—Fri.	**Run advertisement in food section of daily newspaper.** Edwin Booth, tragedian, born, 1833. Hutchinson patented telescopic holder, 1833.
14—Sat.	Pike's Peak discovered, 1806. A house in Newport, R. I., was lighted by gas by Melville, 1806.
15—Sun.	Great Boston fire, 1872. Tokyo, Japan, builds gas works, 1872.
16—Mon.	Oklahoma admitted as state, 1907. **Conduct store demonstration. Hold meeting with salesmen.**
17—Tues.	**Half of sales period has passed; go over plans and make sure all is in readiness for last period.**
18—Wed.	**Hold meeting with employees to see if they have exhausted every possible clue that may lead to a sale.**
19—Thurs.	Jas. A. Garfield, 20th President, born, 1831. **Check over advertisement for tomorrow's papers.**
20—Fri.	Peregrine White, first child born in New England, 1620. **Use 'phone to try to interest or close hard prospects.**
21—Sat.	North Carolina, 12th state to ratify U. S. Constitution, 1789. **Check over advertisement for tomorrow's newspapers.**
22—Sun.	Leonard Calvert settled, Maryland, 1633.
23—Mon.	Battle of Chattanooga, 1863.
24—Tues.	Zachary Taylor, 12th President, born, 1784. Jean Pierre Minckelers lighted gas distilled from coal at University of Louvain, 1784.
25—Wed.	British army left U. S. 1783. **Have store demonstration.**
26—Thurs.	**Thanksgiving Day.**
27—Fri.	Artemas Ward, patriot, born, 1727. **Run newspaper advertisement featuring "Sale Closed Monday."**
28—Sat.	U. S. Cherokee Indian Treaty signed, Hopewell, S. C.
29—Sun.	1785. **Run last advertisement in newspaper tomorrow.**
30—Mon.	Jefferson Davis, elected President of Confederate States. **Last day of sale.**

Pipe Line Design and Construction

for Manufactured Gas and Natural Gas

With the background of U. G. I.'s 49 years of experience in the gas industry

Visit Booth 421 at the A. G. A. Convention

*

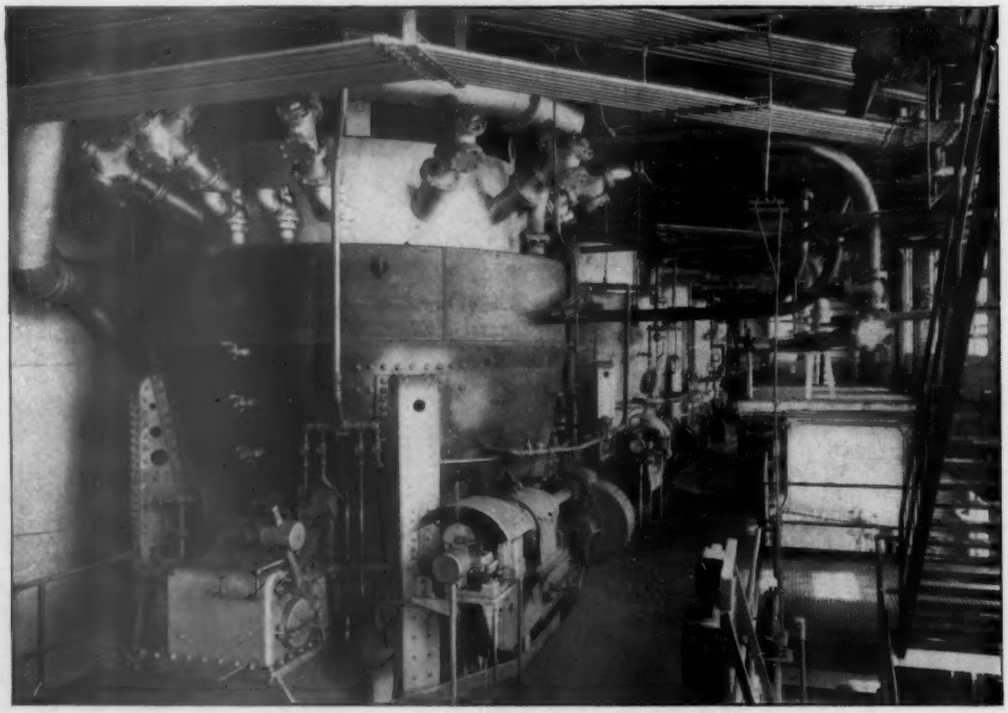
THE U. G. I. CONTRACTING COMPANY
DIVISION OF
UNITED ENGINEERS & CONSTRUCTORS
INCORPORATED

Philadelphia
112 North Broad Street

Chicago
Conway Building

MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

FOR BASE AND PEAK LOADS WITH



Four U. G. I. Mechanical Generator Sets at Chester, Pa., using Refinery Gas.

THE U. G. I. MECHANICAL GENERATOR

36 Installations to October First

Advantages

Continuous operation for extended periods
Low fuel consumption
Low labor costs
Low carbon loss in ash
Low maintenance
Heat otherwise lost retained as steam
Bitum'nous coal can be used as fuel

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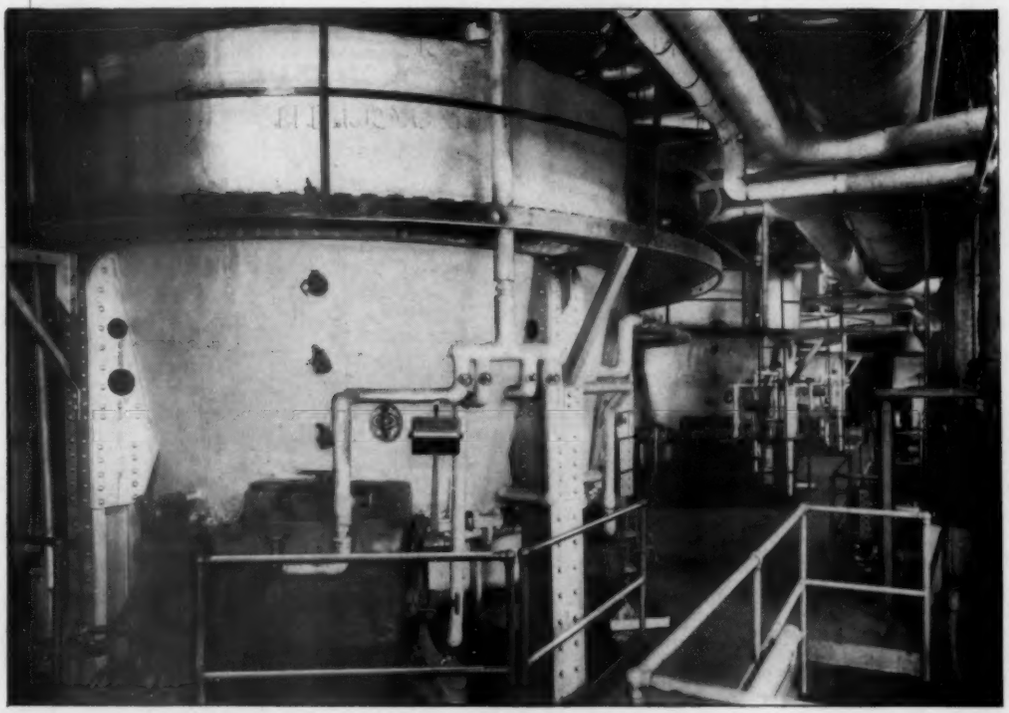
MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

MANUFACTURED AND NATURAL GAS



Three U. G. I. Mechanical Generator Sets at Philadelphia using Heavy Oil.

THE U.G.I. HEAVY OIL PROCESS

(Patented)

Represents over 10 years' experience in the use of heavy oils

Successfully used at Philadelphia; New York; Newark; Atlantic City; Norwalk and New Haven, Conn.; Long Branch, N. J. and Tampa, Fla.

* * * *

We shall be glad to discuss the savings which the U.G.I. Heavy Oil Process makes possible.

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MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

EXPERIENCE in thousands of plants has shown conclusively that fire brick, bonded with the proper refractory cement, lasts longer and suffers from fewer costly annoying interruptions and shut-downs for repairs.

But it is important to bear in mind that *no one method or material* can possibly meet every condition. That's where you can profitably use Quigley service and experience.

Quigley Company offers a complete line of high temperature cements and plastic refractories, to meet almost every condition encountered in present-day, high-heat-duty boiler furnaces. There's a Quigley product to correctly meet your conditions. We will be glad to show how these materials can be applied with profit in your plant.

SERVICE

Quigley products are carried in stock in industrial centers throughout the United States, Canada, and in 27 other countries. Quigley service-engineers are available to advise with users of refractories anywhere in the solution of furnace construction and maintenance problems.

HYTEMPITE

the *Standard* High Temperature Cement

HYTEMPITE has many every-day uses in the furnace room. Keep a drum handy. It is air-setting, forms a strong bond *without heat*, and becomes an integral part of the structure to which it is applied. It is ground extremely fine, is easy-working and stays in suspension. Use HYTEMPITE for laying fire brick with thin, strong, air-and-gas-tight joints; for protective surfacing over brickwork; for monolithic "GAS/TITE" baffle construction; for quick, permanent furnace repairs.

To Make and Keep Joints TIGHT

Q-SEAL

"High Pressure Steam, Oil, Acid, and Chemical-Proof" Joint Sealing Compound

Q-SEAL is a plastic, expansive joint-sealing compound with unusual properties—ideal for fabricating threaded, flange, gasket, and metal-to-metal joints—in lines carrying steam, gas, gasoline, oils, acids, ammonia, brine, creosote, tar, air, and other corrosive materials.
Q-SEAL withstands high temperatures and pressures, and is impervious to steam, oils, acids and chemicals. It is a natural lubricant and remains plastic—permitting joints to be broken with ease, regardless of age or conditions to which they have been subjected. Q-SEAL has solved a great many difficult joint-sealing problems. It will pay you to give it a trial in your plant. *Write for folder U-2b.*

HYDRO-SEAL

Waterproof Joint Sealing Compound

HYDRO-SEAL is a superior, waterproof, non-corrosive, rust-preventing, lubricating plastic filler to make and keep joints tight in lines carrying water, gas, air, and low pressure steam.
With HYDRO-SEAL, "frozen joints" are impossible. It remains plastic, and is unaffected by vibration or contraction and expansion. It contains absolutely no injurious elements, is brown in color, and is ideal for sealing joints in lines carrying drinking water. It is well adapted for sealing joints in brass pipes—makes wrapping of threads unnecessary. It is light in weight, spreads evenly, and is very economical. HYDRO-SEAL is an exceptional product. Investigate its possibilities in your plant. *Details in folder U-2c.*

Other Quigley products include several additional refractory maintenance materials—ACID PROOF Cements—TRIPLE-A corrosion-resisting protective coatings—ANNITE detergent materials for every cleaning problem. All are tested and proved quality-products, backed by Quigley experience and service. We will be glad to send you literature describing any or all of our products.

QUIGLEY COMPANY INC.
INDUSTRIAL SPECIALTIES
56 West 45th Street, New York, N. Y.

QUIGLEY COMPANY OF CANADA, LTD. MAIN OFFICE AND PLANT, LACHINE, P. Q.

Let's Sell Some Ranges

SOME gas men seem to be of the opinion that the day has passed when it is necessary to aggressively merchandise the gas range. They say: "Every home must have a range to cook on and as we have spent years upon years educating the home-manager to the advantages of gas as a fuel, our range job is simply one of reselling. When the manufacturer produces a new design or incorporates a new feature or sells us a line at a new price we may feature those things and induce a certain percentage of our customers to dispose of their present ranges and purchase the new models."

What these men say, in a couple of nut shells, is the attitude of too many gas men when the subject of a rip-roaring range sale is suggested. They feel that the cooking load is more or less caught and hog-tied by the gas industry and that, aside from "new models" and "new prices," they have very little to talk about. They do not believe that there is enough "show" in gas ranges to make a big "showing" in either added revenue or in merchandise sales.

Why this is so, we cannot fathom. It is our firm belief that unless we gas men do keep everlastingly plugging at the sale of gas ranges we are going to wake up some fine day and find that other fuels have made appreciable inroads on a cooking load that we have taken a long time to develop.

If any gas man may doubt the probability of this let him give a little time to investigating the methods employed by the dealer in and manufacturer of electric ranges in developing the market for what they term the "flameless fuel." It may be that the reader's particular situation, for one reason or another, has not yet been effected by the sale of electric ranges in any great number, and that a local investigation would fail to uncover the true facts in showing what inroads are being made. However, it is safe to say that somewhere close at hand there is a community which is not served with gas that will provide a true picture. Aside from this, let the man, who is of the opinion that the cooking load is the gas man's, thumb through the pages of the current popular magazines, and then if the results of the casual survey do not get him to thinking we miss our guess.

It seems to us that the electric industry has attacked the matter of range selling from an entirely different angle; from the one most generally employed by the gas man,—one that the gas man may have used in the beginning and still may use advantageously. The electric man has fought shy of cut prices, premiums and trade-ins as dominating features in his advertising and in his sales plans, and has featured such appeals as: "Economy, certainty, speed, coolness, convenience, comfort and cleanliness." He has stressed "automatic, beauty, porcelain and insulation," and he has planned both his advertising and sales activities on a basis of a whole year's activity.

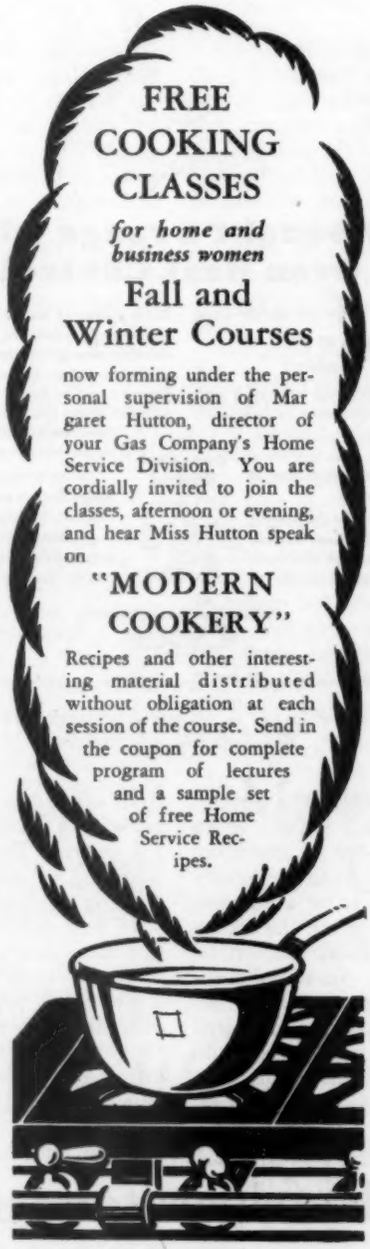
Now these features are not new for the gas man; they are factors that he seems to have overlooked, perhaps with the idea that price was the trump that the buying public expected and acted upon.

From the foregoing, and despite it, we are offering as a suggestion an "Eleventh Hour Drive" to put your range bogie over for 1931 and make you and your organization range minded to the extent that you will put the proper pressure on range sales during 1932.

The first thing to do, if you are *sold* on the idea that you have to go after the range business, is to go over your records and ascertain just what you may do in the way of building a 1932 gas range quota. Spot out who may be sold, where they live and about the type of range they should buy. Next choose the line of ranges you expect to feature, get your initial stock—then plan your activity.

Have a range set up and connected; go over it every inch; have the Home Service Director use it for baking, broiling, frying, canning; let her give it the third degree,—pick it to pieces; let the service man and the shop foremen do likewise and then and only then, if you have set-in on all these investigations, you'll be keyed-up and ready to tell your salesmen all about what Mrs. John Consumer wants in the way of a gas range. And if you're a dyed-in-the-wool gas man you'll sure be full of pep and go, after you have subjected any representative make of range to such a once over. If you become enthused and can impart that enthusiasm to your salesmen and keep them that way you can beat any bogy you may set for the year or special activity.

Assuming you have taken the first step as outlined above, the next thing to do is to make up a work sheet showing just how your activity is to be carried on. All preliminary work should be done before the day the sale opens


FREE
COOKING
CLASSES
for home and business women
Fall and
Winter Courses
now forming under the personal supervision of Mar garet Hutton, director of your Gas Company's Home Service Division. You are cordially invited to join the classes, afternoon or evening, and hear Miss Hutton speak on
"MODERN COOKERY"
Recipes and other interesting material distributed without obligation at each session of the course. Send in the coupon for complete program of lectures and a sample set of free Home Service Recipes.
— — Ask Your Gas Company — —
CONSOLIDATED GAS COMPANY
of New York
HOME SERVICE DIVISION
212 West 57th St., N. Y. City
Dear Miss Hutton:
Will you kindly send me, at your earliest convenience, a program of your Home Service lectures for the fall session . . . I should also like to have a set of your Home Service Recipes.
Name.....
Address.....

Here's a little advertisement that gets over the cooking class announcement

on November Second.

The preliminary work should consist of arranging for window displays, newspaper, bill-board, truck, store, bill insert and direct advertising, as well as lecturers before women's clubs, demonstrations and news releases to your local newspapers. Prospect lists should be gone over carefully and supplied to the salesmen; employee cooperation plans and employee purchase plans should be perfected. If you are going to conduct a contest of any sort the details of the manner of making awards etc., should all be carefully checked. If present customers are to be organized on the plan to "use the user" all details in regard to that plan should be completed; if dead services are to be worked on, a list of dead services should be compiled and turned over to the salesmen. Plans for employee meetings should be arranged for and scheduled at once.

Betty bought a range with an Oven Heat Control

The first cake she made with it was as good as mother's

BETTY'S MOTHER believed it took years of experience to bake well.

But Betty changed that theory the other day when she baked her first cake in her own home.

For the range she bought has an Oven Heat Control which measures the oven heat just as accurately as Betty measures and mixes the ingredients. In measuring and mixing she eliminates guess-work. Now she eliminates it from baking—because Betty's own Gas Range is equipped with this device that accurately measures the oven heat and keeps the oven at any temperature.

An Oven Heat Control

Let us or one of the local range dealers explain more fully how to bake your costly ingredients perfectly by means of the Oven Heat Control on the new Gas Range.

PACIFIC GAS AND ELECTRIC COMPANY

P·G and E

Here is a good layout to follow in advertising the features mentioned in this article

Where employees are cooperating with the merchandising department a general meeting should be planned. This meeting should be an evening meeting and should be opened by an executive of the company, whose duty it would be to outline briefly the activity and express his desire that it be a success. The range to be featured should then be given the center of the stage at this meeting and a full explanation be given as to its points of superiority, etc. An actual demonstration might be arranged by the Home Service department. The advertising to be used should be exhibited and, following this exhibit, the sales manager should assign quotas, as well as team-up salesmen and employees. He should also go over the plan of compensations, prize awards, etc. Dates of special demonstrations should be announced and the special offer to employees should be made.

If the management will endorse such a set-up as this and then manifest an interest in it through the whole period of the activity there can be no failure.

For the month of November, if we were called upon to conduct an intensive drive to sell gas ranges, we would center our whole activity around just what the electric man is using to put over the idea of electric cookery: *"What the modern gas range will do for you* would find its way into every piece of advertising and every sales talk. I might call my campaign anything from a "Drive on Antiquated Kitchens" to "Better Foods Month," and I might have my salesmen and employees in A Turkey Eating Contest or some other kind of contest. And yet, I'd get away from giving the customer the idea that when she purchased she was doing anyone, save herself, a favor and kindness, and I'll go farther—I'd impress her with the fact that she had been very wise and prudent when she modernized her kitchen and cooking appliance.

If you don't think you can put gas ranges over on this basis don't try. However, if you do think you can and want some quick help in the way of plans, advertising material or window display material, wire the manufacturer whose line you handle—he knows that gas ranges can be sold anytime, anywhere, despite any condition, *if* someone is willing to dish out enough chatter and ring enough door-bells.

Sell The Gas Refrigerator And The Other Appliances Will Take Care Of Themselves

WILLIS PARKER

SELL the gas refrigerator and the other appliances will take care of themselves. This, in short, somewhat expresses the opinion of Clyde H. Potter, commercial manager of the Southern Counties Gas Company which serves many communities in several southern California counties. From his experience, the installation of a gas refrigerator means that the other gas services will be retained in the home and that new appliances will follow, either as additions or as replacements of obsolete equipment. The refrigerator clinches the argument that gas is still a modern household utility and that gas appliances may be used as home modernizing elements as readily and economically as other types.

Much of the sales effort should be focussed on refrigerators, in Mr. Potter's opinion, for they contain all of the elements needed to support their own sale and the sale of their companions—the range, the space or central house heating equipment, the storage hot water unit. Also, it frequently is possible to make a sale of three different units during one interview through the initial discussion and sale of a refrigerator.

Consider the elements that help to sell the refrigerator.

In each of the company's divisional sales offices is a stripped-down unit which exposes to immediate view a frosted ball and a gas flame within a few inches of each other. The prospect may, with one hand, feel the ball and note its temperature, and, if he doubts the heat of the flame, he may feel of it with the other hand. Such a paradox—heat making cold—is bound to attract attention. While explaining the principles of gas refrigeration, the salesman has an opportunity to bring out salient selling points, such as its dependability, its silent functioning, its low cost of service and its economical operation.

Any person will immediately recognize that an appliance using many moving parts will require service from time to time, whereas an appliance which has no moving parts will require practically no service. Also, the prospective buyers will recognize proof of the assertion that gas and gas appliances may be as readily used for modernizing the home as any other medium. The refrigerator proves that other gas appliances of equal modernness and utility are available and practical.

Selling Points

Interest having been gained by the intriguing, paradoxical appliance, the prospect's desire to possess a modern kitchen is further aroused and stimulated when the salesman recounts the delightful frozen desserts which may be made in a mechanical refrigerator and the many other conveniences embodied in it. Then follows something about the economy of mechanical or automatic refrigeration which enables the housewife to reduce the amount of food thrown away. It may be shown, sometimes, that the savings of throw-outs made will almost pay for a gas refrigerator. The prospect visualizes the unit in her kitchen and mentally computes the possibilities of purchase.

If she brings her husband in, he's just as fascinated by the appliance as she is, regardless of how much he knows about chemistry, mechanics or whether he knows anything about machinery.

Nor does the refrigerator cease its sales effort when it is installed in the home. Pride of possession is a dominant factor, especially so because of the aforementioned paradox, and the man of the house, as well as his wife, will take his friends to the kitchen to prove that fire will make ice. Thus friends are convinced of the modernness of gas.

But who will buy gas refrigerators and other modern gas appliances?

From the standpoint of retaining and building the load, the gas industry must watch one class of people in particular, according to Mr. Potter—the families with incomes ranging from $4,000 to $8,000. He explains:

"When the family income ranges from $4,000 to $8,000, we frequently find that the wife is a bit of a social climber. She wants to have her home as well furnished and as modern as those of her friends and is readily influenced by what her friends have in the way of modernized kitchen equipment. Also, she is a prodigious reader of better homes, better kitchens and better methods articles in women's magazines. She's ready to consider almost any appliance which will give her modernized home prestige.

The Servant Question

"The woman who has a larger income undoubtedly leaves the kitchen work to servants and is not so concerned with the modernness of the equipment; she doesn't take her friends to the kitchen anyway. Time is an important item to servants and they recognize that a gas range provides quick heat. Since they are not paying the bills, they are none too sparing in the use of gas.

"Below $4,000 incomes, we find housewives who must do a great deal of cooking. They recognize the economy of gas, so we needn't worry about them. Therefore, we can and should concentrate our efforts on the middle class and keep them 'gas-minded.' We have the appliances that will enable them to have as modern kitchens as any of their friends. Sell such a woman a gas refrigerator and it is almost certain that she will continue to use gas for cooking, gas for heating and gas for heating hot water. And, if she hasn't the most modern types of appliances, she will likely purchase them."

We have mentioned the possibility of selling three or four appliances at one shot by first getting the prospect interested in and purchasing a gas refrigerator. We do not mean by this that the salesman should endeavor to sell them at one and the same time. According to Mr. Potter, selling gas appliances in general and the full line at one and the same time is analogous to a clothing salesman showing a prospect all of the suits in the house. The customer becomes confused and may walk out without making a purchase. But, if the salesman will show the customer one or two suits at a time, will expound their merits, style and quality, thus concentrating the visitor's attention upon them, he probably will make the sale. And so it is with gas appliances—too many types and varieties at one time are confusing.

Mass Display Moves Gas Heaters

SPECIAL CORRESPONDENT

"A WOMAN may buy but one hat a time but if she were shown that particular one only or shown even just a few hats, she would leave the shoppe without purchasing. The same is largely true with other merchandise such as gas heaters for instance," says J. M. Wilder, local manager of the Howard G. Fields Lumber Company of Houston, Texas.

Wilder practices what he preaches in the way of displaying in mass form. This retailer reasons that it does not cheapen an article to display it in large quantities; but it does impress the shoppers with the fact that the firm is making a large showing and that it must be doing a big gas heater business to make such an extensive display.

Last year this firm moved a large volume of heaters of the radiant type during a special promotional event that was more a matter of special display and special suggestion than a matter of reduced prices. Selling on the theme of getting the home ready for winter, an entire carload of radiant type gas heaters were displayed at one time—actually displayed and not placed in the warehouse.

This firm has a battery of five display windows and three large model show rooms which are just back from the sidewalk and take the place of the usual unsightly fence that is found to the front of lumber yards.

Each of these display windows was decorated in appropriate fall and winter colors for background; then gas heaters attractively displayed at different levels. One of the windows had a model fireplace built in it from building board that was squared off with white chalk and with the board tinted grey to resemble a brick fireplace. A heater was placed in the fireplace with similar heaters spotted about in the window.

The model display rooms, each one representing a different type room of the home, were likewise arranged home-like and each displaying the best type of heater for the particular room.

In the office building and main merchandise and show room of the firm, a large display-island was built to the center of the floor space. This display island was made three levels high, each being stair-stepped to display a complete circle around on each of the three levels.

Other gas heaters were spotted about in groups over the display room. Over the shelving for paints, builders hardware and similar items, other gas heaters were displayed, impressing customers with the fact that this firm was making a very wide showing of these seasonable heaters.

The manager of this firm says, "People naturally begin thinking of their new roofs, new floors, weather strips and other repairs and remodeling jobs for the home during the fall and winter. It is but natural to coordinate proper heating along with these home repairs—the time to sell a bathroom insert wall heater is when the bathroom is being repaired. And surely the prospect who is thinking of repairs to cut out the winter weather is certainly interested in space heaters for the different rooms.

"For these reasons, we tied in our home repair sales with heater sales and vice versa. Our type of mass displaying certainly helped to get over the idea that it was time to consider the heating problems for winter. This type of display moved a carload of heaters within a few days, to say nothing of building up contacts that will be coming in for future sales."

A Section of the display-island built to the center of the main showroom or salesroom of the Howard G. Fields Lumber Company, Houston, Texas. Other heaters were shown from the top stock shelving displaying paints, hardware, etc.

Here's How

Frank Pexton, outlines the methods which sold Gas Househeating in Kansas City, Missouri

THE Kansas Gas Company set up a quota of 5000 house heating jobs for each of the years of 1929 and 1930, and sold the quota. The sales force consisted of approximately 55 territory salesmen and 2 special salesmen who sold exclusively to builders and real estate firms. The territory men exchanged territories at the first of each year. For advertising, the company used sixty large sign boards supplemented with additional newspaper advertisements.

In considering gas for heating, three questions stand out very vividly in the prospect's mind; first, will I have plenty of gas to heat with in severe winter weather? Second, how much will it cost me in comparison with my present fuel; and third, what will be the cost of the necessary gas equipment?

The question of a dependable gas supply is the most important. Until about fourteen years ago most of Kansas City used gas for heating purposes and the supply gave out in the dead of winter. This question can usually be answered successfully when selling a conversion burner for the prospect's old furnace by pointing out the fact that the company has spent millions of dollars in the last few years in building pipe lines from large and adequate fields such as the Texas Panhandle field, the Oklahoma City field, and various others in Kansas, Oklahoma, and Texas. The fact that the company has three major pipelines and two smaller pipe lines supplying Kansas Cty with the provision of standby fuel at the industrial plants in case of emergency, most always impresses the prospect favorably. A comparison of the modern concrete highways with the

old dirt roads and the modern gas transportation system and adequate fields with the old one line system and small fields may be used with a great deal of success. When selling the prospect a straight gas fired furnace or boiler with no possibility of a quick change-over to some other fuel the points mentioned above must usually be repeated and impressed very vigorously on his mind. The fact that the gas company supplied plenty of gas during January, 1930, when it was 15° below zero is also a very effective selling point.

The question of fuel cost must be handled with diplomacy. Due to the fact that some customers claimed that past estimates were guarantees, the company forbade giving any estimates. The salesman can usually give the prospect a good idea of what it will cost him to heat with gas by citing the bills of some of his neighbors. Inasmuch as fuel bills vary nearly as widely as grocery bills the salesman should point out the reasons why they vary. He should have at the tip of his tongue the reasons why Smith's gas bill was high. He should know by inquiry what the different coal and oil bills in the neighborhood have been, what temperatures were carried and whether the homes were heated completely and satisfactorily. He should be familiar with the different heating systems, oil burners, coals, etc. in order that he may answer any objection the prospect may offer relative to the high cost of heating with gas. House heating literature put out by the American Gas Association is very helpful in acquiring technical knowledge and also salesmanship. In discussing cost it is usually good practice to establish the additional amount that it will cost the prospect if the question of cost is holding up the sale and then pass on to the advantages of gas.

The question of the cost of gas equipment should be kept separate from the fuel costs. Do not let the customer add the payments on gas equipment to the gas bill. Consider the equipment as an investment in the home. Always point out the additional amount the customer would have to pay for a straight gas fired furnace and the savings that the additional investment will effect.

Advantages of Gas

The three main objections raised by the customer, namely, supply, fuel costs, and equipment costs have been discussed first, but in reality they will usually be the last for the salesman will no doubt open his sales talk with the outstanding advantages of gas. The advantages of gas over coal are:

1. Freedom from coal dust, dirt and ashes.
2. Automatic temperature control.
3. No firing labor required.
4. Lower decorating costs.
5. A better heated house.

These different advantages can be used very effectively against the objection of higher fuel costs. For instance, "What if it does cost ten to twenty per cent more, Mr. Smith? Isn't it worth the price to have a much cleaner home, saving your wife the drudgery of shoveling coal, carrying out ashes and scrubbing her floors more often? Isn't it worth something to have a thermostat to control the heat? You perhaps can sleep ten or fifteen minutes later in the morning. Your wife can go down town and not worry about the house burning down or being cold when she returns."

The advantages of gas over oil are:

1. Freedom from a greasy soot.
2. Lower fire and explosion hazard.
3. Less noise.
4. Automatic heat if the oil burner has no thermostat.
5. Lower costs (if gravity burner is being used.)
6. Constant fuel supply.

The same sales talk can be used for gas versus oil as gas versus coal. It is usually more difficult to replace oil than coal due to the fact that the prospect may have from $100 to $600 invested in oil burning equipment which is giving good service. The salesman should know of any oil fires in the neighborhood and point out the fact that gas is more safe. The fact that Jones had an oil explosion and had to redecorate their whole house is a strong sales point for gas.

The advantages of gas and the prospect's objections have been discussed briefly. In working out a sales plan for a year the salesman will have to thoroughly canvass his territory and become acquainted with the people. He should get into every house he can and inspect the furnace; he may find a broken fire bowl that the owner knew nothing about and sell him a gas furnace. He may find that in the more elite neighborhoods he can secure entrance only by calling first on the prospect at his business address. He will learn by hearsay of troubles someone is having with his oil burner which he won't tell the salesman. He will probably establish a friendship with some lady here or there who will tip him off to good prospects.

The salesman should keep in close touch with the people in his territory as the heating season passes on; he should find out if possible how long their coal or oil will last and call back when they will need additional fuel. He should keep in touch with the fire department in order that he may know of any oil or coal fires and call on the owners. He must make night calls or he won't be a gas salesman long. He will no doubt hear many more minor objections that he must work out answers for. In short, a salesman to sell gas for house heating should know the game, the people in his neighborhood, continually work and keep in touch with his prospects and use all his ingenuity to secure the good will of the people in his territory.

District Sale Nets 150 Gas Ranges In One Month

IN a new community, or one where gas is just being introduced, the sale of a gas range means additional consumption of gas—additional revenue for the utility as well as the appliance. But in old established sections, such as New York, where nearly everybody uses gas, the sale of a new range means simply replacing the present range with one of a more modern type. It is scarcely to be wondered at, then, a Gas Range Sale of the ordinary type is not enthusiastically welcomed by executives, since it brings no revenue save the slight profit derived from the sale of the range itself.

The Republic Light, Heat & Power Co., Inc., Buffalo, N. Y., a while back conducted a decidedly successful campaign, however, along lines that were somewhat different, the sale netting 150 ranges during the month of the sale, and a decided increase in the gas consumption per user. This is the way R. N. Hartzell, advertising manager, tells of it:

"This particular Gas Range Sale was featured in all

our New York State properties, which include the towns of Niagara Falls, Batavia, Dunkirk, Tonawanda and six or eight towns of smaller population. Our customers in these New York State towns number approximately 25,000.

"This sale was conducted for a period of thirty days, during which time approximately 150 gas ranges of various makes were sold. A Brilliant-fire Gas Heater was used as a premium and was presented to the customer purchasing any make of gas range they selected. It was selected by George L. Schofield, General New Business Manager for these properties as a premium, because a greater per cent of the gas range sales in New York state replace obsolete cooking equipment. Accordingly, in presenting customers with a gift of this kind, it resulted in additional revenue instead of just holding the present revenue which is the case in a straight gas range replacement.

"It was noted that the gas ranges selected during the sale were of the most modern type, ranging in the neighborhood of $100. The gas heater given as a premium retailed for $16.50.

"Four-column space was used in the newspapers during and previous to the sale, illustrating and describing the gas heater, and explaining the terms. Displays of the heater were also made in the window and show rooms.

"Terms given were two dollars down, and the balance in 24 equal payments extending over a period of two years. The manufacturers did not enter into this campaign at all, as we did not feature any particular line of ranges, but offered the gas heater with any cabinet range.

"As a further inducement to the buyers we allowed a flat rate of $5.00 for their old stove, no matter what its condition. All of the stoves thus received were promptly broken up and sold as junk, thus effectually taking care of the problem as to our getting our money out of them through re-sale. It does not pay to bother with re-conditioning old stoves. It is mostly an advertising proposition, anyway, and by handling them as junk we get them off our hands, and a fair sum to apply on publicity expense.

"One of the best features of the sale was the fact that it brought in so many people to look at our ranges. While there they saw other equipment, and sales of all gas appliances took a jump during the sale period."

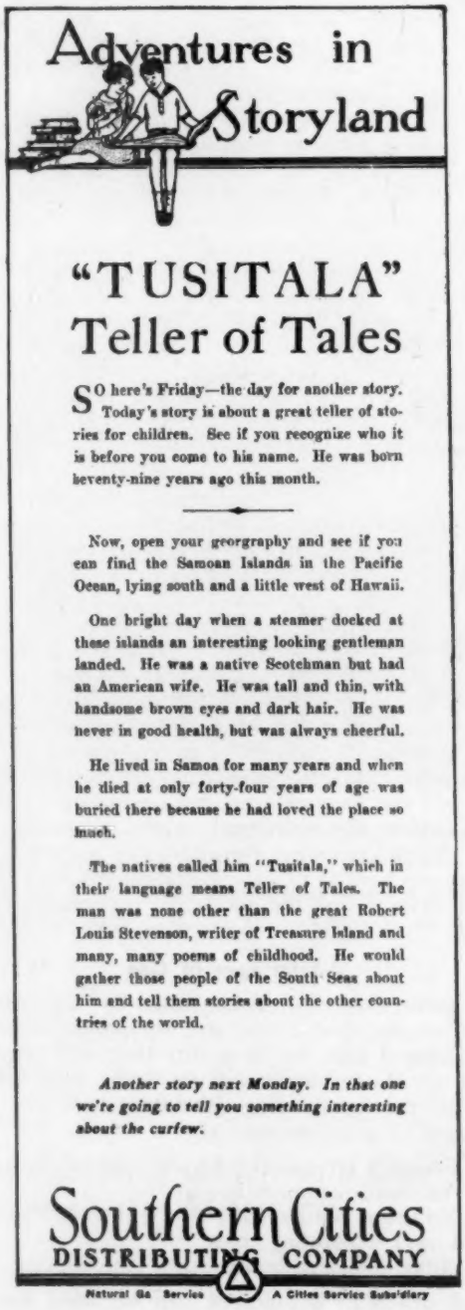
Children's Stories Get Reader Interest

CHAS. N. TUNNELL

"PRACTICALLY all gas distributing companies reach the home by some form of advertising—and there is surely no better medium of reaching the home than through the children," says John L. Fletcher.

Mr. Fletcher is advertising manager of the Arkansas Natural Gas Corporation and of its subsidiary, the Southern Cities Distributing Company.

A unique institutional advertising campaign was conducted some time ago for the Southern Cities Distributing Company of Shreveport, Louisiana, by Mr. Fletcher. Incidentally, the plan is still worth while. This advertising manager explains, "There is little interest to the old stories of the convenience, economy and comfort of natural gas when most citizens of Shreveport have these conveniences from gas daily—but when we answered the problem for the parents of Shreveport of 'What shall I tell them tonight?' by publishing a series of children's stories, we obtained reader interest in every home where there were children."


Adventures in Storyland
"TUSITALA" Teller of Tales
SO here's Friday—the day for another story. Today's story is about a great teller of stories for children. See if you recognize who it is before you come to his name. He was born seventy-nine years ago this month.
Now, open your georgraphy and see if you can find the Samoan Islands in the Pacific Ocean, lying south and a little west of Hawaii.
One bright day when a steamer docked at these islands an interesting looking gentleman landed. He was a native Scotchman but had an American wife. He was tall and thin, with handsome brown eyes and dark hair. He was never in good health, but was always cheerful.
He lived in Samoa for many years and when he died at only forty-four years of age was buried there because he had loved the place so much.
The natives called him "Tusitala," which in their language means Teller of Tales. The man was none other than the great Robert Louis Stevenson, writer of Treasure Island and many, many poems of childhood. He would gather those people of the South Seas about him and tell them stories about the other countries of the world.
Another story next Monday. In that one we're going to tell you something interesting about the curfew.
Southern Cities
DISTRIBUTING COMPANY
Natural Gas Service
A Cities Service Subsidiary

Starting the latter part of November, the opening announcement of this institutional advertising campaign was made. This announced the series of "Adventures in Storyland" and related the introductory story regarding Charles Perrault, author of Mother Goose Stories.

This first ad of the series was a four column by fif-

teen inch; two columns by twelve inch advertisements followed on each Monday, Wednesday and Friday until the last of the series about the middle of February. Each story was headed by "Adventures in Storyland"; these stories appeared on the same page as the comic strips.

Radio broadcasting was used for several days to announce this series of stories—but after the first story or two, the children themselves gave the series enough publicity. The story themes were timely in most instances. For instance: The Boy Scouts held a convention in Shreveport during the time of this advertising campaign—a story of the series told about the founding of the organization. One of the stories told of Robert Louis Stevenson, master of story telling; another told of James Whitcomb Riley. One of these stories prior to Thanksgiving explained "Why Turkey"; while many of the stories were local legends of how certain streets obtained their names and similar colorful stories of local interest.

"Judging from the many letters, telephone calls and personal comments, our series of stories was well received by children and parents alike," says Fletcher.

This series of advertisements was purely institutional, gas was not mentioned in any way. The name of Southern Cities Distributing Company at the bottom of each story was the only commercial tie-up made. This advertising manager explains, "The campaign was conducted during the winter months—at a time every one was using gas and at a time when children's stories are most appreciated."

The Legal Side of Our Industry

Leo T. Parker discusses

Providing Safe Working Place
Responsibility of Employer for Injury
Liability for Injury to Fireman
Liability for Intrastate Taxation
Power to Condemn Private Property
Cancellation of Lease Contract
Right to Remove Equipment
Validity of Gas Rate Ordinance

Duty of Gas Company to Furnish Safe Working Place

THE obligation of a gas company to provide reasonably safe places and structures for employees to work upon does not impose upon it the duty of keeping a building in a safe condition at every moment of their work, so far as its safety depends upon the due performance of that work by them and their fellows. However, if an unusual danger exists it is the duty of gas company officials, or others in charge of the work, to warn employees of the danger. Failure to do so will result in an injured employee being entitled to recover damages.

For instance, in Fisher *v* Laclede Gas Co., 31 S. W. (2d) 770, a gas company plant was being repaired. In order to do this work it was necessary to take up certain floor plates. This necessarily left an opening in the floor. This hole was barricaded on all sides by two by fours laid on the top of barrels, but the barricade near the edge on the south side was removed while the men making the repairs were actually at work. Tools and materials were scattered over the floor along the way, and in picking his way through them an employee slipped, stumbled, and fell through the opening to the floor below and was seriously injured. He sued the gas company for damages.

In holding the injured employee entitled to recover $10,000 damages, the Court said:

"Said passageway or aisle over which plaintiff (injured employee) was passing and was required to pass was made of old, worn steel sections, and was slick and slippery and was covered with tools, materials and debris used by the defendant in the making of the said repairs and said opening was not provided with a safe and secure barricade along the passageway used by employees, and persons, particularly plaintiff, while walking over and working about said floor were likely to slip and fall and be injured, thus rendering said place dangerous and not reasonably safe."

Law Valid Which Makes Employer Responsible for Injury to Employe

In Seabury *v* Arkansas Natural Gas Corporation, 130 So. 1, it was disclosed that a state law provides that any employer engaged in a hazardous business shall be liable for any injury sustained by a workman.

The Arkansas Natural Gas Corporation was engaged in the business of drilling wells for oil and gas and of selling its products to the public. In its drilling operations it was necessary to move pipe and equipment from one well to another. A contractor named Jarrell was employed to move certain pipe and he in turn employed an employee to do that work. The employee was injured while performing his work and he sued the Arkansas Natural Gas Corporation for damages.

The counsel for the gas company contended that the above law should be invalid because Jarrell was the principal contractor who hired the injured employee and that only Jarrell could legally be held liable. However, in holding the gas company liable, the Court said:

"There is no violation of contract rights in the act under consideration, and hence the statute is not unconstitutional on that score. It was clearly within the power of the Legislature to make the principal engaged in a hazardous business liable to any workman employed in such business whether such workman was employed by the principal or by an independent contractor or vice-principal. The act in this respect does not restrain the liberty and freedom of contract any more than it does in making the principal liable for injuries to workmen directly employed by such principal."

Motor-Truck Owner Liable for Injury to Municipal Fireman

In almost all cases the Courts have held gas companies liable in damages to members of city fire departments who are injured as a result of the driver of the gas company's motor vehicle failing to drive to the curb and stop when hearing the signal warning that a fire truck is approaching.

For example, in Padgett *v* McKissick, 280 Pac. 409, it was disclosed that a fireman was standing on the left running board of a fire truck and sounding a siren to give warning to the traffic of the approach of the fire truck. A motor-truck driver heard the signal but failed to turn to the curb and stop. When he came to a street intersection he turned to the right and the driver of the fire truck, instead of attempting to pass the motor-truck on the left side ran into it, seriously injuring a fireman who sued the owner of the motor-truck for damages. The lower Court held the fireman not entitled to damages, but the higher Court promptly reversed this verdict, saying:

"In the present case testimony was introduced which tended to show that Protzman, the driver of the truck, saw and heard the approaching fire truck and arbitrarily held the road until the fire truck had gotten within 15 or 20 feet of him. It was within the province of the jury to consider this testimony and to determine whether or not the conduct of

Protzman was arbitrary or wilful, and determine the necessity, if any, of the fire truck in passing the truck on the right-hand side. . . . Had the driver of the defendant's motor-truck stopped his vehicle at the street line . . . the fire truck would have passed without interference."

When Gas Company Is Liable for Intrastate Taxation

Generally speaking, a gas company conducting an interstate business is not required to pay a state occupational or excise tax. However, if the business is purely intrastate the situation is quite different. An excise tax is neither a property tax nor an attempt at license and regulation under the police powers of the state. It may, however, be levied upon the right to engage in a purely intrastate public utility business, and, when so levied, the amount of the tax may be measured by consumption of a product or the gross receipts from such business. Thus the Courts inevitably return to a determination whether the particular business is truly and essentially a local and intrastate business separate and distinct from the elements of interstate commerce. It is the interstate commerce itself which must *not* be burdened by state exactions which interfere with the exclusive Federal authority over it, not local or intrastate commerce.

For illustration, in East Ohio Gas Co. *v.* Tax Commission of Ohio, 43 F. (2d) 170, the state of Ohio passed a law which provides that electric light, gas, natural gas, waterworks, telephone, messenger or signal, union depot, heating, coaling, and water transportation companies shall pay excise tax for privilege of carrying on its intrastate business, to be computed on gross receipts on intrastate business.

The East Ohio Gas Company transported its gas from West Virginia through Ohio and supplied gas to various cities in Ohio. The counsel for the East Ohio Gas Company contended that the latter could not be compelled to pay the tax on its business in Ohio, because it conducted an interstate business.

Therefore, the only question for decision of the Court was whether the business of the gas company, the retail distribution and sale of natural gas in the cities of Cleveland, Youngstown, Akron, etc., was to be regarded as a local and intrastate business subject to the excise tax imposed by the state law, or whether the fact that the gas is brought by pipe lines from West Virginia is classified as interstate commerce, which, it was conceded, cannot be burdened by an excise tax. In holding the gas company bound to pay the tax, the Court said:

"It must be conceded that, inasmuch as transportation of whatever goods, from a point of origin in one state to a point of consumption in another state, is interstate commerce, so here the transportation of gas by pipe line from West Virginia to Cleveland is interstate commerce. . . . The petitioner (East Ohio Gas Company) is a public service corporation, exercising rights of eminent domain and occupancy of the public streets. It exercises its franchises only through grant from the state, even though control of such franchise grants is delegated to the municipalities. The tax purports to be, and is, we think, an excise tax; that is, 'an impost for a license to pursue certain callings, or to deal in special commodities, or to exercise particular franchises.' . . . The gas must be considered processed and modified in an essential characteristic when its pressure is so reduced as to make it available for consumers' use, if analogy to the processing of goods, as breaking the interstate journey, be drawn; and, so far as the relationship between the company and consumers is concerned, it makes no difference whatever to the latter whence comes the gas. The trade was essentially local. The transportation of the gas from West Virginia was but a preparation for it."

Power of Gas Company to Condemn Private Property

It is well settled that where an owner of private property refuses to sell his land to a gas company, which requires the same, the latter may appropriate the same and pay a *reasonable* valuation therefor.

In all condemnation proceedings, the exercise of the power being necessary for the public good, and all property being held subject to its exercise when and as the public good requires it, it would be unjust to the public that it should be required to pay to the owner more than a fair indemnity for the loss he sustains by the appropriation of his property for the general good.

On the other hand, it is important to know that while public service corporations are permitted to exercise the right of eminent domain, and thus acquire against even an unwilling owner valuable rights in his land, it is the public interest, and *not* the private right of the public service corporation or its stockholders, which confers upon such corporation the right of eminent domain. In every instance it is the public right, and not the private interest, which gives rise to the extraordinary right of eminent domain. And because of this public interest the Courts will not permit a private property owner to compel a gas company to pay the speculative value of condemned and appropriated land.

For instance, in Yagel *v.* Kansas Gas Co., 291 Pac. 768, a private property owner endeavored to compel a gas company to pay damages for appropriated land based upon the injury *likely* to occur in addition to the value of the land. The Court refused to hold the gas company liable for an amount greater than the actual valuation of the condemned land, and said:

"While, therefore, it is the intent of the law that all the actual damages which may naturally and proximately result to the remainder of a man's tract of land by reason of the condemnation of a right of way for a public purpose across it shall be paid to him, the law will not permit mere speculative elements of damages, based upon an ill-defined fear that at some unknown and indefinite time in the future some misfortune may come to some man or beats by reason of such improvement, to enter into the consideration of those who, under the law, are required to fix the amount of the damages."

Lease Contract Held Cancelled

The law is well established that where a gas lease expressly provides that the contract shall terminate if no well is drilled within a fixed period, unless the gas company on or before a fixed date shall pay to the lessor a certain sum, such contract is automatically cancelled, if the gas company fails to drill the well and pay the specified amount to the property owner within the designated time. This rule is applicable although the gas company acts in good faith and endeavors to fulfill the terms of the lease contract.

For example, in Harris *v.* Kerns, 291 Pac. 100, a gas company agreed in a contract to drill a well upon certain property before October 15th or pay the property owner a certain sum of money before this date. The gas company failed to drill the well, but paid the money on October 16th, believing it was being paid on October 15th.

In holding the contract automatically cancelled, the Court said:

"It seems to be well settled that where a gas lease expressly provides that rights of the parties shall terminate if no well be commenced within a fixed period, unless the lessee on or before that date shall pay or tender to the lessor a fixed sum, time is of the essence of such a contract, and, unless a well is begun or the rentals provided for paid, the contract is automatically terminated at the end of the period for failure either to commence the operations or to pay rentals. . . . It seems apparent therefore that under this rule, although the defendant (gas company) delayed but one day after the period provided in the contract, and clearly acted under an honest mistake and thought they were paying the rental on the day it was due . . . we think the contract was automatically cancelled. . . . It seems rather a harsh rule under the facts here presented, as lessee acted in good faith, but, if the lessee can delay one day, we know of no reason why he could not delay two, or a week, or six weeks."

Right of Lessee to Remove Equipment

The general rule is that permanent buildings erected by a gas company on the leased premises are not removable as trade fixtures unless the lease contract expressly or impliedly reserves to the gas company the right to remove them. Moreover, when it is stipulated in the lease contract that structures, ordinarily removable by a tenant, shall belong to the landlord on the expiration of the lease term, the latter acquires ownership in such structures *immediately* on their construction. In other words, a gas company cannot remove from leased premises legal fixtures before or after expiration of the lease.

For illustration, in Roanoke *v.* Standard, 154 S. E. 518, it was disclosed that a lease contract stipulated that the tenant should erect and install upon the leased premises "buildings, equipment, and appliances, and such structures were to belong to the property owner at the termination of the lease." The tenant installed a large tank and after termination of the lease he at-

tempted to remove the same from the property. In holding the property owner entitled to retain all equipment, including the tank, on its property as its own, the Court said:

"Our conclusion is that where, by the lease, the tenant is given the right to install a large storage tank . . . and, on the termination thereof, such storage tank is to become, along with other buildings and structures, the property of the lessor, it partakes of the nature of a permanent fixture."

When Gas Rate Ordinance Is Valid

Generally speaking, if legal passage of a city ordinance operates as a binding contract, a city cannot thereafter impair the obligation of such contract. On the other hand, if an ordinance is not valid no contract is made and, therefore, the ordinance is ineffective.

For instance, in Columbus Gas & Fuel Co. *v.* City of Columbus, Ohio, 42 F. (2d) 379, it was disclosed that for many years the Columbus Gas and Fuel Company and the Federal Gas and Fuel Company had been operating as public utilities in the city of Columbus, Ohio, supplying natural gas to its inhabitants under municipal franchises. In the year 1924 the city undertook by ordinance to fix the price of such natural gas at 40 cents per thousand cubic feet, net, for a period of five years from September 12th. This ordinance was made the subject of attack, as confiscatory, in a suit. The five years covered by that ordinance being about to expire, the city council, on June 3rd, 1929, passed another ordinance fixing the price at 48 cents for the remaining portion of 1929, and at a sliding scale of from 65 cents to 55 cents thereafter for a period of five years from January 1st, 1930. This ordinance also provided for the consolidation of the two gas companies, for the quality of gas to be supplied, for extensions and improvements, for an option to purchase or lease the gas companies' properties by the city, for the settlement of all then pending litigation between the city and the companies, and for the repayment to consumers of the sums impounded in the pending litigation. The ordinance was duly accepted in writing by the companies, but no steps were taken to submit it to the electors under the provisions of the city charter.

On August 5, 1929, the city council, acting upon the assumption that failure to submit the last ordinance to the electors so far invalidated the action theretofore taken as to permit a repeal, and passed another ordinance providing that "council hereby declares its intention not to submit this ordinance to a vote of the people." Subsequent rate ordinances were passed by council, which were submitted to popular vote and one of which was approved. Thereupon the gas companies appealed to the Court the question of the rates fixed by such later ordinance and contended that the gas rates stipulated in the second ordinance were binding.

It is interesting to observe that the higher United States Court refused to agree with this contention, saying:

"The sole question is, therefore, whether the passage and acceptance of Ordinance 410-29, without its submission to popular vote, resulted in a contract, with attending vested contract rights. . . . The conclusion at which we have arrived definitely prevents granting the relief prayed for, which, in substance, is the specific enforcement of Ordinance 410-29."

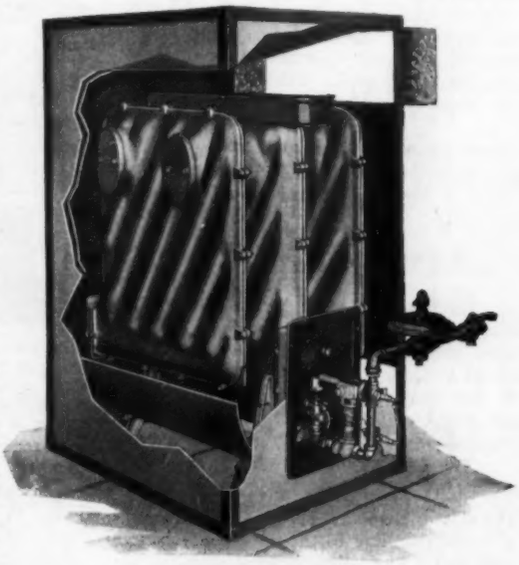
EQUIPMENT NEWS

New Auxiliary Gas Furnace

The Forest City Foundries Co., Gas Equipment Division announce the new Niagara Auxiliary Gas Furnace for house heating. They state: "It has been apparent for some time that there are many prospective users of gas for house heating who have not been reached by house heating appliances available. Two of the chief causes are well known to every one: cost of the equipment and cost of fuel.

The Niagara Junior Auxiliary Gas Furnace was designed to reach these possible users. It is moderate in first cost. It is a highly efficient, well designed gas furnace in itself, built to operate alongside and through any style coal furnace, giving the advantages of gas heat in all except the most severe winter weather, when the coal furnace may be used. It adds practically nothing to annual fuel bills.

Operation is simple and effective. Connected up by two boots, the Niagara Jr. takes the cold air from the lower part or base of the coal furnace, assisted by a fan, pushes through the gas furnace, and out through the top boot back into the hood of the coal furnace and on up through the houses.



A hook-up of this nature presents many advantages to the user. According to the size of unit he wants and the type of gas available, he can have sufficient heat for all year-around, or for spring and fall use only, when a few hours of heat daily is sufficient or where the cost of gas is extremely high. The consumer can at any time use his coal furnace in conjunction with the gas unit to burn up rubbish or to add additional heat in sub-cold weather.

The Niagara Jr. Gas Furnace can be controlled thermostatically, and it can be equipped for automatic humidification.

Every unit has an efficient and dependable quick-acting Safety Pilot as standard equipment. The Safety Pilot Valve closes the pilot gas as well as the main burner.

Damper controls for primary and secondary air are automatic, and there is also a damper to close off the gas unit entirely from the coal unit if desired.

One of the primary advantages of a unit of this type is that if the customer is dissatisfied with the cost of operation at any time, he does not tear it out leaving nothing but the coal furnace to use. With the Niagara Jr. he can shut it off at any time but it is always available for further use.

Wherever a Niagara Jr. has been installed, it is the first step to all year gas heating without any original investment loss to the consumer. It is so constructed that another Niagara Jr. of the correct size can be easily connected to the one already installed, doing away with the coal furnace entirely and giving a completely efficient all-year gas unit.

New Free Vane Air Operated Recorder Controller

The Bristol Company, Waterbury, Conn. is offering a new line of Air Operated Recording Controllers, employing a "Free Vane" as the initiator of control, which is a new departure in Air Operated Control.

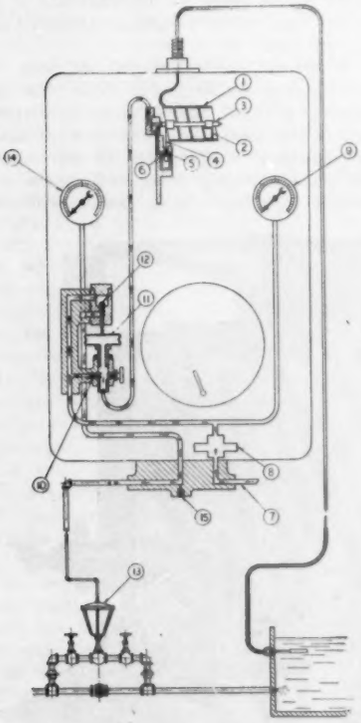
The "Free Vane" is attached to and actuated by a measuring element of a temperature or pressure recording system and moves between two air jets with stream lines coinciding placed opposite each other. In passing into these air streams, the "Free Vane" varies the amount of air which escapes from the jets, thus effecting control.

The arrangement and design of the two jets and the free vane are such that the vane floats between two equal air streams at right angles to its motion, hence the position and movement of the measuring elements are not affected. The recording device is, therefore, free to reproduce the

temperature or pressure with complete accuracy.

The operation of the Free Vane Air Operated Recording Controller is as follows—

Air at 15 lbs. pressure is admitted through connection (7) and carried through filter (8), one branch leading to an indicating gauge (9). The other branch turns to the left and supplies air to the control system. This supply branch in turn divides into two branches, one passes through an orifice (10) supplying



the elastic element (11) and then through a connecting line to the opposing jets (5) and (6). The other branch supplies air to the pilot valve (12) and through the pilot valve to the indicating gauge (14) and outward to the top of the diaphargm motor valve (13).

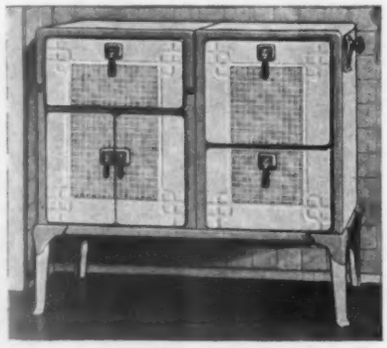
The air which enters through orifice (10) is dissipated through jets (5) and (6). The amount which may be dissipated through these jets depends upon the position of the free vane (4). This vane, being directly attached to an elastic element (1) of the hollow helical type, is moved by changes in the temperature at the sensitive bulb shown in the bath at the lower right hand corner. The changing amount of dissipated air at jets (5) and (6) produces a pressure change on the elastic element (11) and a consequent deformation which operates pilot valve (12) admitting more or less air to the top for operating the diaphragm motor valve (13). The elastic element (1) also carries the recording penarm which is attached to the shaft (3).

The Free Vane Recorder Controller is enclosed in a two part cast-aluminum case of moisture proof construction. It is furnished with inverted penarm and fountain pen as standard equipment. The chart is rotated by a powerful Spring Clock. The case is available for wall or flush mounting. Furnished as a single or two-pen instrument in combination of pressure or temperature and has a pressure range up to 1500 pounds per square inch and temperature range up to 1000° F., using 12" charts. Temperature measuring systems may be either Vapor or Gas Filled depending on the operating temperatures encountered.

A new catalog No. 4001, fully illustrating and describing this instrument will be mailed on request.

New Addition to Magic Chef Line

The American Stove Co., Cleveland, O., announce the addition of a new model "Magic Chef" gas range line. The new model is designated as Series "600." They state that the new model was especially designed to fill the price gap between the



Series "600"

29 series and the 500 series. The new range is enameled in old ivory finish with two tones of green for trim. The cooking top is 23" x 22½", and the cooking cover when closed provides additional space to store utensils, and also conceals and protects the gas valve handles from meddling fingers. Descriptive leafflet will be mailed on request.

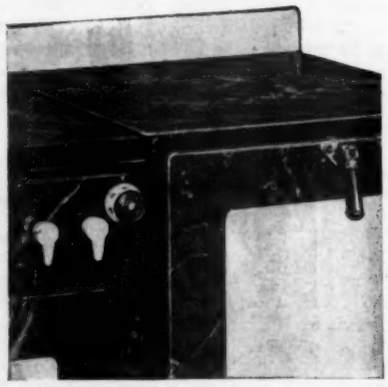
New Oven Heat Control Models For Table Top Ranges

The Milwaukee Gas Specialty Co., Milwaukee, Wis., recently announced Thermolator Models "F" and "FR" oven heat controls especially designed for table top ranges.

These Models are of simpler, and more compact design and are installed on the front of the table top range which adapts the range to limited spaces, an important factor in small kitchens and apartments. This front-and-center dial installation leaves the end of the range entirely free of all cumbersome fittings, the oven control is conveniently close to the gas cocks, where it is easier to set and read and cleaning the dial and range is a much simpler matter.

The makers of Thermolator state that Models "F" and "FR" represent further advances in oven heat control simplicity, and that they are in effect a more compact form of control installed in an entirely different manner. This hitherto unattainable simplicity and compactness and design they say has not only heightened the efficiency of the control but has materially reduced initial production costs and installation expense.

The connections between gas supply and burner are direct and simple, and the



amount of piping needed is comparatively small. Thermolator "F" and "FR" come completely assembled, ready to install and the number of parts and operations have been reduced to a minimum. A single bolt attaches the Thermolator and, in the majority of cases the piping is outside the oven wall.

These models are styled in the modern manner with a wide variety of artistic dials, highly individualized in design, in sizes and colors to harmonize exactly with the style and finish of the latest table top ranges.

Descriptive illustrated literature may be had by addressing the manufacturers.

Two New Models of "Vulcan" Heavy Duty Ranges

The Standard Gas Equipment Corp.,

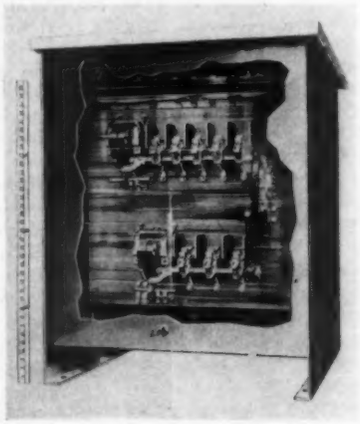
No. 4748 "All-Hot-Top" Range

18 East 41st Street, New York, recently issued a booklet describing the new improved "Vulcan" heavy duty cooking

equipment. It includes two new models—one with all hot-top and the other a six-burner top which increases the cooking capacity. Insulated ovens and oven heat control are optional with either model. Copy of booklet will be mailed on request.

New A. C. Explosion Proof Auto-Transformer Starter

A new oil immersed, explosion proof, auto transformer type automatic starter for A.C. squirrel cage motors, is announced by Cutler-Hammer, Inc., Milwaukee, Wis. Designed to comply with



Underwriters' requirements for Class 1, Group D installations, it provides a six inch head of oil above the contacts and incorporates oil level indicator and outside spout for replenishing the oil without removing the cover. Terminals are located above the level of the oil so that the oil will not cause the rubber insulation to deteriorate and cause short circuiting.

The starter panel proper consists of a three pole and a five pole contactor mounted on a slate panel and interlocked to prevent them from both closing at the same time. The auto transformer and overload relays are mounted on a bracket at the rear of the panel. The panel is fastened to an angle iron frame which slides into channels at the sides of the tank, allowing easy removal of the panel.

Applications for this new motor starter include all locations where explosive or corrosive gas or dust may be prevalent.

New TAG Flow Instruments Catalog

The C. J. Tagliabue Manufacturing Company of Brooklyn, N. Y., announces a new and very complete sixteen page catalog describing and illustrating the full line of TAG Flow instruments which comprises Flow Recorder-Controllers for Liquids, Flow Meters and Orifice Meters for Gases, Flow Recorder-Controllers for Gases and Liquid Level Recorder-Controllers.

Included in this catalog are numerous photographs and diagrams of applications.

This new catalog—No. 1020—can be obtained upon request.

NEWS *of the* GAS INDUSTRY

Dixie Gulf Gas Properties Transferred to United Gas Public Service Company

Another step in the process of simplifying the corporate structure of the United Gas System was announced recently in transferring all properties and assets of the Dixie Gulf Gas Company to the United Gas Public Service Company, the principal operating subsidiary of the United Gas Corporation.

Liquidation of the Dixie Gulf Gas Company places extensive pipeline facilities under direct ownership of the United Gas Public Service Company only a few weeks prior to a public offering of the latter company's Preferred Stock.

The United Gas Public Service Company now is engaged in the three phases of natural gas service—production, transportation and distribution—on a scale which places it among the leaders in the industry, company officials pointed out.

Prior to its liquidation, the Dixie Gulf Gas Company consisted of a main pipeline system extending from the Waskom Compressor Station in the Waskom gas field to Houston and Beaumont. The line consists of approximately 137 miles of 22-inch pipe from the Waskom Compressor Station to the Goodrich Compressor Station; 76 miles of 18-inch pipe from Goodrich to Beaumont and Port Arthur; and 63 miles of 16-inch pipe from Goodrich to Houston.

The company also has a line from the Waskom Compressor Station to Marshall, consisting of 19 miles of 8-inch and 10-inch pipeline; natural gas gathering systems in the Waskom and Panola fields; a field compressor station in the Panola field, and the main line compressor station in the Waskom field at the terminus of the main line.

The Dixie Gulf Gas Company supplied gas to industrial consumers in Beaumont, Port Arthur and Houston as well as other points along the lines where the United Gas Public Service Company and affiliates distribute natural gas to industrial and residential consumers.

Liquidation of the Dixie Gulf Gas Company will bring no change in personnel, officials announced, all employes remaining in their present posts.

Minnesota Towns to Get Natural Gas

Several cities and towns in southern Minnesota will be using natural gas for the first time in their history by December 1.

The Northern Natural Gas Company has secured the right-of-way, contracts have been let, and construction has been started on the first section of the Minnesota extension. Gas to Minnesota will be piped from the present northern terminus of the main line at Mason City, Iowa, in a 16-inch line extending northward sixty-five miles as far as Owatonna, Minn.

The Peoples Natural Gas Company, which is the distributing division of Northern Natural System, has already obtained eighteen franchises in southern Minnesota towns.

Natural Gas in Des Moines

Natural gas will soon be available in Des Moines, the largest city and capital of Iowa. The branch line, which is now under construction, takes off from the Northern Natural Gas System's 24-inch main line at Ogden, continuing southeast for thirty-six miles until it reaches the city limits of Des Moines.

The Natural gas will be used to enrich and supplement the present artificial gas service.

To Build Two Large Holders

Announcement was made recently by The Philadelphia Gas Works Company that two gas holders of 10,000,000 cubic feet capacity each would be added to the plant equipment. These holders will be the largest in Philadelphia, the next size in use being of 5,000,000 cubic foot capacity.

The large increase in the use of gas for house heating during the last two years has convinced the company that when industrial conditions return to normal the present holder capacity will be insufficient. The total cost of the two holders will be approximately $1,000,000.

Fremont Now Using Natural Gas

Natural gas is now being used in Fremont, Nebr. Fremont is reached by an 8-inch branch from the Sioux City line. Numerous house-heating installations have already been contracted, according to F. A. Woodworth, manager of the Fremont Gas company.

Granted Franchise

The Empire Investment Company has been granted a franchise to serve gas in Snohomish, Washington, re-establishing service that was discontinued several years ago.

That company is now serving thirteen towns with its gas service outside of Detroit Lakes. All of these towns are in the adjacent territory to Detroit Lakes and are served with undiluted 2,550 B.t.u. propane gas delivered from the company's plant in Detroit Lakes by tank truck.

To Construct Butane-Air Gas Plants

The Central Hudson Gas & Electric Corporation has received permission to construct gas plants and furnish gas in the town and village of New Paltz and the town of Marlboro. The company proposed to install a Butane-air gas plant in the town of New Paltz and another in the town of Marlboro. Both plants are of 156,000 cubic feet capacity at a cost of $23,000. A distribution system in New Paltz is estimated to cost $52,254. The transmission line will be built from Marlboro to Milton at an estimated cost of $26,897. The distribution system in Milton is estimated to cost $8,864 and the distribution system in the village of Marlboro, $21,940.

Municipal Rate-Making

An attempt on the part of the City Council of Richmond, Virginia, to reduce the rates for gas in the municipally-owned and operated plant was frustrated through a veto of the ordinance by Mayor J. Fulmer Bright. The ordinance proposed to reduce the rate to the domestic consumer, up to 10,000 cubic feet per month, from $1.26 per thousand cubic feet to $1.15 and to lower the rate to large consumers, between 10,000 and 100,000 cubic feet from 85 cents to 65 cents per thousand cubic feet.

The Mayor vetoed the ordinance on the ground that the city could not afford to lose the revenue in the face of decreasing tax receipts from real estate and the necessity for unemployment relief during the coming winter.

Editorially urging the Mayor to veto the ordinance, the Richmond *News-Leader* said in part: "The city's receipts from its gas works are $1,627,000 a year, and represent a profit of about half that amount, according to the city's methods of bookkeeping. This can be regarded either as a return on the city's investment in the gas works or as a special tax levied with approximate justice on all classes of citizens in proportion to their general standard of living. It is a profit, the city is entitled to apply to other public service. If it is a tax, the city cannot do without it. To reduce the rate on 2,000 to 10,000 feet from $1.26 to $1.15 a thousand is simply to pass on $55,000 in taxation to other classes of property in order that councilmen may claim the prestige of getting lower gas for the people."

Minnesota Town Gets Propane Gas Service

A franchise has been granted to Municipalities Gas Co. to furnish propane gas service to the City of Wadena, Minnesota.

Gas service is already being installed and served by their subsidiary, Detroit Lakes Gas Company of Detroit Lakes, Minnesota.

Convention Calendar

October

Sept. 25—Oct. 30. Course of instruction in Domestic Gas Appliances, New York University, New York, N. Y. Classes held Friday of each week. Under direction of Mrs. Frieda Winning, head of the Home Economics Dept., New York University.

12-16 American Gas Association, Atlantic City, N. J. Alexander Forward, 420 Lexington Ave., N. Y. C., managing director.

12-16 Twentieth Annual Safety Congress & Exposition, Stevens Hotel, Chicago.

22-23 Wisconsin Utilities Association, Commercial Section, Hotel Loraine, Madison, Wisconsin. John N. Cadby, Executive Secretary.

November

16-17 Second Southwest Regional Gas Sales Conference, Hotel Arlington, Hot Springs, Arkansas.

16-21 Third Annual Conference on Bituminous Coal, Pittsburgh, Pa.

December

8-11 Eleventh Annual Gas Meter Short Course and Conference, Iowa State College, Ames, Iowa.

To Move Plants

Plans have been completed by the United Gas Public Service Corporation of Houston, Tex., to move twenty-five units of its compressor station at Waskom, Tex., to the station at Alto, La., in the Richland gas field.

The moving of the plant will include a vertical compressor station of 160 horsepower units, which will increase the capacity of the Alto station to 60,000,000 cubic feet of gas daily. Completion of the project is expected about November 1.

Rapidly diminishing pressure in the Richland field is given as the reason for the move. The installation of the compressor at the Alto station will help in supplying gas to the Interstate Natural Gas company, Mississippi River Fuel corporation and the Arkansas-Louisiana Pipe Line company, which is furnished from the Richland field by the United Gas Public Service corporation.

Booklet for Home Service Directors

The first booklet of the Manual of Home Service entitled "Home Service Home Calls," prepared by the Home Service Committee of the American Gas Association, is ready for distribution. This booklet discusses the various kinds of home calls, methods of discussion, etc. Questions arising during complaint calls on ranges, refrigerators, clothes dryers, water heaters, house heating appliances and special equipment are listed. The answers to the questions have been approved by gas engineers and representatives of the American Gas Association Testing Laboratory. The examples of Home Call work which are discussed in this book have been actual experiences of Home Service workers.

Copies of this booklet can be secured at 10c a copy from the American Gas Association.

Earnings of United Gas Improvement Co.

Following the September meeting of the board of directors John E. Zimmermann, president, The United Gas Improvement Company, announced that operating revenues of subsidiary utility companies of U. G. I., for the three months ended August 31, 1931, were $24,779,279, and for the same period of 1930, $25,421,731, a decrease of $642,452. During this period decreased revenue due to reductions in electric and gas rates amounted to approximately $656,000.

Operating expenses for the same period of 1931 were $14,294,899, against $14,933,652 in 1930, a decrease of $638,753.

Earnings of such utilities applicable to their common stocks for the same period of 1931 were $6,255,619, as against $6,331,734 in 1930, a decrease of only $76,115.

Combined earnings of U. G. I. and subsidiaries for the three months ended August 31, 1931, applicable to U. G. I. common stock were 32.50 cents per share, compared with 35.29 cents per share for the same period of 1930.

Figures for the eight months ended August 31, 1931, compared with the corresponding period of 1930 were reported as follows:

Operating revenue of utility subsidiaries $70,381,229 for 1931 and $72,017,178 for 1930, a decrease of $1,635,949.

Operating expenses, $40,117,250 for 1931 and $41,493,682 for 1930, a decrease of $1,376,432.

Earnings of these subsidiary utilities applicable to their common stocks amounted to $19,031,300 for 1931 and $19,053,489 in 1930, a decrease of only $22,189.

During the eight months' period of this year combined earnings of U. G. I. and subsidiaries applicable to U. G. I. common stock, amounted to $.9640 compared with $1.0304 for 1930.

Gas Pipe Line Being Laid

An 8-inch pipe line is being laid to serve natural gas to the city of Hastings, Nebraska. It will require three miles of 8-inch pipe and a town border measuring and reducing station. Gas will be furnished by the Nebraska Natural Gas Company and distributed by the Central Power & Light Company of Hastings.

Extending Gas Service to Three Towns

Polo, Oregon and Mount Morris will be supplied with gas service for the first time when the Illinois Northern Utilities Company begins to operate the high pressure transmission and distribution systems that are now under construction. Gas will be supplied through a high pressure main extending north from Dixon.

Personals

Herbert A. Southworth, for two years sales manager of the Fall River Electric Light Company, has been appointed assistant manager of North Adams Gas Light Company, Adams Gas Light Company, Williamstown Gas Company, and Stamford Light, Heat and Power Company. He will make his headquarters at North Adams, Mass.

Mr. Southworth went to Fall River from Quincy in September, 1929, as merchandise manager and took over the organization and management of a new department for the promotion and sale of electrical merchandise.

D. B. Bear, formerly in charge of Sales and Advertising of the Cumberland and Allegheny Gas Company at Cumberland, Md., has been made Assistant Sales Manager and Supervisor of Advertising of the Pittsburgh District.

Kenneth C. Long is the newly appointed Commercial Manager of The Dayton Power & Light Company. Mr. Long received his engineering training at Purdue University, and entered the service of the Company in 1914 as a meter reader. In a short time he was made a meter tester, and in 1916 he was placed in charge of the testing laboratories of the Company. A few months later he was made assistant engineer.

After the Armistice he returned to the Company where he continued until 1925, when he went to Chicago to become industrial engineer with the People's Gas Light and Coke Company. Later he served as Sales Manager with the United Public Service Company in charge of the Indiana and Ohio divisions. In 1929 he returned to The Dayton Power & Light Company as industrial power engineer. His duties in his new position will include both gas and electric commercial activities.

E. A. Roehry has been appointed chief engineer of the Central Illinois Group of Illinois Power and Light Corporation, it was announced recently by E. W. Fowler, manager.

The position he will fill is a new one created by the company. Mr. Roehry will have general engineering supervision of the six divisions in the Central Illinois Group.

He comes from St. Louis where he has been general manager of the St. Louis Electric Terminal Railway company. He has been connected with the I. P. L. in different position for about 20 years.

George W. Steele is now manager of domestic sales for the Laclede Gas Light Co., St. Louis, Mo. He was formerly connected with the Kansas City Gas Co., Kansas City, Mo. in charge of refrigeration sales.

W. E. Boyd recently assumed the position of Manager of Sales and Gas Appliance Department of the Fort Stockton Gas Co., Fort Stockton, Texas.

J. N. Hickman has been named assistant commercial manager of the Texas Public Service Co., Austin, Texas. Mr. Hickman was formerly commercial manager for the Kansas Public Service Co., Lawrence, Kansas.

Gilbert Estill was recently appointed Gas Measurement Superintendent of the Oklahoma Natural Gas Corporation of Tulsa, Okla.

James Fitzgerald, formerly in charge of Transmission and Production Operations of the Cumberland and Allegheny Gas Company, at Weston, W. Va., has been made Assistant Superintendent of Production of the Pittsburgh District.

Alfonso Mitchell has been appointed local manager of the Community Natural Gas Co. at Clifton, Texas. Mr. Mitchell was formerly located at Temple.

Howard Egbert has been appointed Public Relations and Advertising Manager of the Dayton Power & Light Company.

Mr. Egbert takes over this work following five years of association with The National Cash Register Company in public relations and publicity work, and will have his headquarters in Dayton, Ohio.

Prior to that time he was editorial writer for the Dayton Daily News and associate papers which form the News League of Ohio, starting as a reporter and advancing to the city editor's and Sunday editor's desks to the position of editorial writer.

Coming to Dayton twenty years ago from Hamilton, Ohio, where he was engaged in newspaper editorial work, he has maintained his residence in Dayton ever since and continued a sustained activity in many civic enterprises.

H. P. Taylor was elected Assistant Treasurer of the Wisconsin Public Service Corporation, Milwaukee, at a recent meeting of the Board of Directors.

George Ballard, formerly a sales representative in the New Business department of the Kansas City Gas Company, resigned to take a position with the Panhandle Eastern Pipeline Company as Industrial Engineer.

C. L. Taylor has assumed his duties as manager of the Florence Gas and Fuel Company at Florence, S. C. Mr. Taylor was formerly with the Florida Public Service Company at Orlando, Fla., and has been in the employ of the Associated Gas and Electric System since 1921.

L. D. Allen has been put in charge of merchandising activities of the Norwich, N. Y. district of the New York State Electric Corporation.

E. L. Callahan, formerly General Commercial Manager of the Central Public Service Corporation, has resigned to accept appointment as Director of Sales for the Washington, D. C., Gas Light Company.

C. A. Graves has been appointed manager of the New Inglewood District office of the Los Angeles Gas & Electric Company. Mr. Graves has been in the employ of Los Angeles Gas and Electric Corporation for the past 22 years, in various commercial capacities, which have fitted him to take charge of his new duties. He will be assisted by E. A. Lodmell.

Catherine Cahalan, home economics consultant, formerly of the Newark, N. J., office, of the Public Service Electric & Gas Co., has taken up the duties of the home economics department in the Elizabeth territory. Miss Cahalan will give lectures and demonstrations on the use of gas and electricity to women's clubs, parent-teacher associations and school groups in Elizabeth, Westfield, Rahway, Plainfield and Perth Amboy.

Miss Cahalan is taking the position formerly held by Miss Adelaide Holding who resigned recently.

H. H. Tobin was recently appointed Superintendent of Gas Distribution of the Western United Gas and Electric Corporation, Aurora, Ill.

Henry P. J. Steinmetz has been appointed General Sales Manager of the Public Service Corporation of New Jersey, Newark, N. J. He was formerly Southern Division agent.

James P. Hanlan has been appointed assistant general sales manager of gas sales of the Public Service Corporation of New Jersey, Newark, N. J.

Obituary

ROBERT D. PLATT

Robert D. Platt, Chief Engineer of the Koppers Construction Company, died suddenly at his home in Pittsburgh, Pa., on September 25th, aged 46 years. Prior to joining the Koppers organization in 1912, Mr. Platt had worked with the Pencoyd Iron Works in Philadelphia, the Cambria Steel Company at Johnstown, and the Illinois Steel Company at Gary, in various engineering capacities. As Chief Engineer of the Koppers Construction Company, Mr. Platt was prominently identified with the by-product coke and gas industry. He was a member of the Eastern States Blast Furnace and Coke Oven Operators Association.

TRADE NEWS

United Engineers & Constructors, Inc.—Activities

Central Hudson Gas & Electric Company, Poughkeepsie, N. Y., has awarded contract to furnish, deliver and install approximately 82,050 feet of 8" welded steel main from Highland Freight Station, N. Y., to South Shore of Roundout Creek, at Sleightsburgh, N. Y.

The Central Illinois Electric & Gas Company, of Rockford, Illinois, has awarded contract to furnish, deliver and install approximately 37,000 feet of 2" welded steel main and 100 ¾" services in the town of Pecatonica, Ill.

Contract has been awarded by Consumers Power Company, Jackson, Michigan, to furnish, deliver and install at the plant at Royal Oak, Michigan, two U. G. I. 9'0" I. D. Mechanical Generator Carburetted Water Gas Sets, arranged for soft coal operation, one U. G. I. Vertical blast gas waste heat boiler, and two U. G. I. Model "B" Automatic Control Machines.

C. B. Coldwell Transferred to Ft. Worth Office of International-Stacey Corporation

Mr. C. B. Coldwell who was formerly located in Chicago has been transferred to the Ft. Worth office of the International-Stacey Corporation. He has been placed in charge of the sales of the Roots-Connersville-Wilbraham Division line of R-C-W rotary positive blowers, meters, gas pumps and exhausters, Hayton centrifugal pumps and blowers and the Stacey Bros. Gas Construction Division's Telescopic and Stacey-Klonne dry seal low pressure gas holders and Stacey "Bullet" high pressure gas holders.

The International-Stacey Corporation offices are located at 1309 Aviation Building, Ft. Worth, Texas.

New Sales Manager for Barber-Greene Co.

The Barber-Greene Company of Aurora, Illinois, manufacturers of material handling equipment, announce the appointment as General Sales Manager of Mr. F. D. Hooper, formerly sales manager of the Lidgerwood Manufacturing Company of Elizabeth, New Jersey.

It is felt that he is thoroughly qualified for the position, both as an engineer and sales executive, and that his coming will definitely strengthen the organization. His selection was made only after much study and many interviews with important men in the industry.

Mr. Hooper was born and raised on the "sidewalks of New York." He received his mechanical engineering and electrical engineering degrees at Sibley College, Cornell University, graduating in the class of 1907. He was employed by the Lackawanna Steel Company (now Bethlehem Steel) and the Boston and Maine Railroad before starting his twenty-four years of continuous service with the Lidgerwood Manufacturing Company.

Seybold Appointed Westinghouse Comptroller

Appointment of Roscoe Seybold as comptroller of the Westinghouse Electric and Manufacturing Company has been announced by Chairman A. W. Robertson.

Mr. Seybold, who advances to the position of comptroller from the post of assistant to the president, has been continuously in the service of the Westinghouse Company for 24 years. A native of Rockville, Ind., and a graduate of Purdue Univeristy, he joined the Westinghouse organization in 1907 as a graduate student. After completing this training course, he entered the Price Department, where he remained until 1926. From 1909 until 1922 he was manager of the Price section of the Power and Railway headquarters sales departments. From 1922 until 1926 he served in an executive capacity with the general sales manager. He has been assistant to President F. A. Merrick since 1926.

Election of Officers

At the last meeting of the Board of Directors of the Johns-Manville Sales Corporation T. K. Mial, R. C. Harden, G. R. Lewis, J. M. Taylor and Franklin Shuey were elected Vice-Presidents, to have executive supervision of various territorial districts.

The districts for which these executives will be responsible are as follows:—T .K. Mial, Metropolitan, Boston, Philadelphia and New York State; R. C. Harden, Chicago, St. Louis, Northwestern and Denver; G. R. Lewis, Cleveland, Detroit, Pittsburgh and Cincinnati; J. M. Taylor, New Orleans, Atlanta and Houston; Franklin Shuey, San Francisco, Los Angeles and Seattle.

New Bulletin on E. Y. Sayer Engineering Service

E. Y. Sayer Engineering Corporation, 152 West 42nd St., New York, have recently issued Bulletin No. 17 outlining their engineering service. The booklet is illustrated by way of photographs of power plants constructed by this corporation, and diagrams and drawings of various projects.

Valuable Map Published Showing Gas Fields and Pipe Lines in United States and Canada

International Map Company, Inc., 90 West Street, New York, N. Y., have just published a comprehensive map of the gas fields and pipe lines of the United States, Canada and Mexico. This map will be of special interest to those engaged in the production and transportation of natural gas. It is published in two sections; four colors; size 86" x 50".

The map shows in green names and approximate shape and area of gas fields; and in blue oil fields which produce gas in marketable quantities, e.g., Kettlemen Hills, Hobbs, Oklahoma City, Big Lake, Seminole, etc.

Routes of lines, sizes thereof and names of owners are in red, 239 different pipe line systems are shown on the main map and the insets.

Large-scale inset maps show detail in congested areas. In some sections, notably Pennsylvania, West Virginia and Ohio, symbols are used for the pipe line systems of twenty-four different companies in order that each one may easily be identified. There are seven such maps at the bottom and sides of the main (United States) map. To provide as much space as possible for gas fields and pipe lines on the map, all counties have been omitted. Counties are shown, however, on the various insets. The map is printed on high grade bond paper to permit of changes and additions occasioned by new developments.

This map, which is the result of months of research, has been compiled from detailed pipe line maps and other data furnished by practically every company in the United States and Canada engaged in the transportation of natural gas, as well as from data supplied by officials of many of the oil and gas-producing states and by geologists of several of the major oil and gas companies.

Leaflet giving complete description and prices will be mailed on request.

Meter Repair Parts by Lambert Meter Company

The Lambert Meter Co., Bush Terminal Bldg., No. 4, Brooklyn, N. Y., announces that it has added a new department to its company which is now prepared to supply meter repair parts for all sizes of meters and most makes of meters.

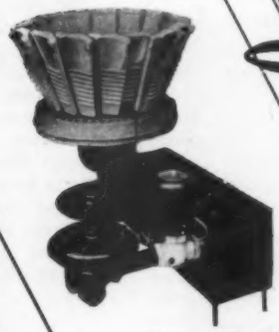
In designing these parts the Lambert Meter Company has improved on the metals used—and increased the sturdiness of the parts.

New General Refractories Booklet

General Refractories Co., Philadelphia, Pa., have issued a 16 page booklet featuring their high temperature mortars and plastic chrome ore. It describes the products and illustrates their various uses.

(Trade News Continued on Page 94)

Standard Type "R" Roberts



Type "G" Roberts

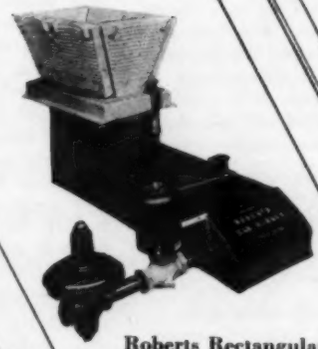
Sell THE COMPLETE LINE

The Roberts Junior

Heat YOUR HOME with Gas

Meet the Bunch at the Sign of this Symbol

Booth 229
A. G. A.
Convention



Roberts Rectangular for Small Heating Units

WHY be content with less than a *complete* line of gas burners?

That's what Roberts offers—a complete line of Controlled Gas Heating Units for heating the smallest home or for largest commercial buildings.

And with the complete line of Roberts Controlled Gas Heating Units is offered a burner priced to meet every pocketbook.

Sell the *Complete* line — the Roberts!

ROBERTS-GORDON
APPLIANCE CORPORATION
CURTISS BLDG. BUFFALO, N. Y.

ROBERTS
CONTROLLED
GAS HEATING UNIT

W. E. Keplinger, Receiver Stacey Mfg. Co., Makes Statement

Mr. W. E. Keplinger, Receiver for The Stacey Manufacturing Company, Cincinnati, Ohio, recently issued a statement to the industry, in which he makes it quite clear that his appointment as Receiver for the Company by the Court is not in any way because of financial difficulty, but brought about simply because of a controversy between certain stockholding interests.

The Company is being operated under the Receivership, absolutely independent of any other interest engaged in a similar business, the same as has been the case in the past, and the personnel under the Receivership, remain largely the same.

All contracts in hand are being executed on schedule and new contracts accepted by the Receiver, must of course, be carried out to a complete and satisfactory conclusion in strict accordance with the agreement covering same.

New Nordstrom Valve Catalog

A 172-page catalog, illustrating approximately thirty types of Nordstrom lubricated plug cock valves, has just been issued by Merco Nordstrom Valve Co., 343 Sansome St., San Francisco. The catalog lists various types of valves made in different metals for handling different liquids, semi-liquids and gases, both neutral and acid. The catalog also lists steam jacketed valves, remote control valves and types with multi-ports, both in low and high pressure. Valves manufactured of bronze, aluminum and Mercalloy for handling corrosion-resistant liquids are also shown, and the catalog is illustrated with actual installations in approximately twenty industries.

New Heating Calculator

The Red Hot Calculator Co., 479 First Avenue, New York City, have issued a circular describing their new Red Hot Calculator, which is a triple circular sliding dial instrument for the purpose of calculating heating systems. It is 5 inches in diameter and is made of rustless, stainless steel. A copy of this circular may be obtained upon request.

New Protective Paint for Pipe Lines

Announcement has just been made by the American District Steam Company, North Tonawanda, New York, that after over two years experimenting and testing, they have perfected a protective paint of unusual efficiency for use on steam and hot water pipe lines.

The product has been named ADSCO Pipe-Kote 505; and according to the manufacturer, it is impervious to any degree of heat generated by steam; is practically immune to the action of moisture, dilute acids and alkalis; and while it produces an extremely hard, tenacious coating, it is sufficiently elastic to expand and contract with the pipe without cracking or peeling.

While Pipe-Kote is especially recommended for use on steam and hot water lines, it works with equal effectiveness on gas and water mains, stacks, boiler fronts, bridges, and all other surfaces exposed to extreme or rapid changes of temperature and atmospheric conditions.

International-Stacey Corporation Opens Division Office in St. Louis

Announcement has come from the general offices of the International-Stacey Corporation, Columbus, Ohio, that Mr. B. T. Ehrnman who was formerly located in the Chicago office of the International-Stacey Corporation has been transferred to St. Louis as Division Manager with offices at Room 2192, Railway Exchange Building.

Mr. Ehrnman has been associated for a number of years with the Roots-Connersville-Wilbraham Division of this company in the sale of gas pumps, meters, blowers and other equipment. With the opening of the St. Louis office he will also have charge of the sale of Ideco Oil and Gas Drilling and Pumping Equipment, Stacey Brothers Telescopic "Bullet" Pressure and Stacey-Klonne Dry Seal Gas Holders, Ideco Standard Steel Buildings, Ideco Airport and Airway Equipment and Ideco Electrical equipment, in addition to the Roots-Connersville-Wilbraham line of products.

J. S. Bleecker Appointed Sales Manager of Lukenweld, Inc.

John S. Bleecker, who has been appointed Manager of Sales of Lukenweld, Inc., (Division of Lukens Steel Company) Coatesville, Pa., was graduated from the Massachusetts Institute of Technology in 1898 where he specialized in both Mechanical and Electrical Engineering. He began his career with the American Bell Telephone Company. Most of his activities for the next twenty-seven years from 1901 to 1928 were confined to executive management of many enterprises for Stone and Webster, Day and Zimmerman and Bates, Inc. From 1928 and until his association with Lukenweld, Inc., in 1931, he was a registered professional engineer engaged in industrial and public utility work, specializing particularly in transportation and merchandising.

Folder Describes New Brown Potentiometer Pyrometer

An attractive 12-page folder has just been issued by The Brown Instrument Company, Philadelphia, Pa., showing in tabloid form the principal features of the new Brown Potentiometer Pyrometer. Extreme accuracy and ruggedness is claimed for this new instrument and the folder shows many of the constructional features substantiating this claim. The folder is arranged for easy reading and gives a very good idea of the instrument illustrated.

New Bulletin on Carrick Stiff-Arm Fittings

The Carrick Engineering Company, 431 South Dearborn Street, Chicago, Illinois, announces a new four-page bulletin "Carrick Stiff-Arm Fittings."

The installation of a System of Automatic Combustion Control requires certain mechanical connections between the Regulating Units of the System and the devices which are to be controlled such as dampers, motor controllers, regulating valves, shafts, etc. The Stiff-Arm Fittings illustrated and described in this bulletin have been designed and are manufactured by the Carrick Engineering Company especially for the purpose of providing means for rigidly connecting the controlled devices to the Regulating Units.

Bailey Meter Sales Engineers Change Location in South

Bailey Meter Company announces the location of Sales Engineers in two southern cities. Mr. M. J. McWhorter, who formerly made his headquarters at 39 Fairhaven Circle, Atlanta, Ga., is now located at 1708 Euclid Ave., Charlotte, N. C. Mr. McWhorter continues as Manager of the Southern Territory, and is assisted by Mr. J. H. Whittlesey, who has headquarters at 3201 Carlisle Road, Birmingham, Ala.

New Quigley Product

Pyro-Mortar is a new dry refractory cement put on the market by the Quigley Company, 56 West 45th Street, New York. It can be used for bonding fire brick, for plaster coatings, for pointing up cracks and reclaiming eroded furnace walls, and other similar applications. A booklet describing this product can be obtained from the Quigley Company upon request.

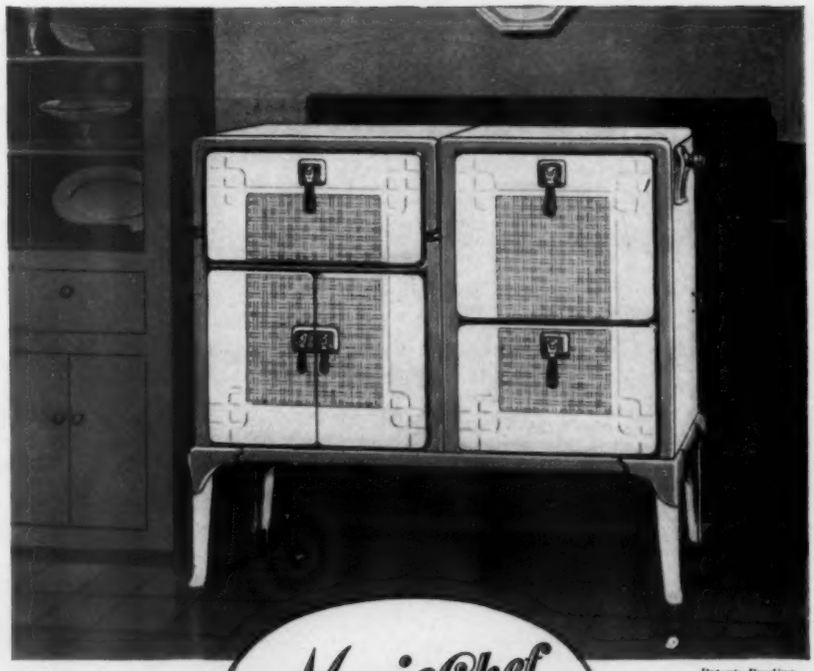
Folder Issued by Republic Steel Corp.

A folder which has just been issued by Republic Steel Corporation on Enduro FC. Type FC is one of the most recent additions to the family of Enduro Stainless Steels. It was developed to meet the demand for an alloy combining the free-cutting qualities of Bessemer screw stock with the corrosion and heat-resisting properties of Enduro Stainless.

The folder contains authentic information on this free-cutting alloy. Copies can be obtained on request.

The NEWEST MAGIC CHEF

SERIES 600



Patents Pending

Magic Chef
AMERICAN STOVE COMPANY

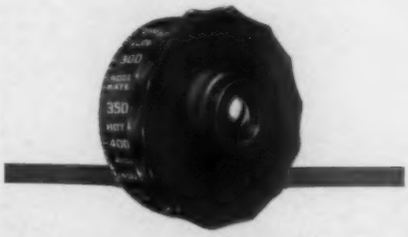
In price and type of gas range, the Series 600 Magic Chef bridges the gap between the top of the line and the popular-priced Series 500.

This newest Magic Chef is extremely handsome and imposing in design and decoration. Its color scheme of Old Ivory with two tones of green for trim and panels of Cocoa-Brown basket weave is decidedly pleasing and will harmonize with every kitchen.

With ample cooking capacity for a large family, Magic Chef Series 600 is built for utmost convenience and efficiency.

Special features include the Red Wheel Lorain Oven Heat Regulator, three-in-one non-clogging top burners, Magic Chef top lighter, new type high burner tray, cabinet type cooking top cover which, when closed, conceals the manifold and protects gas valve handles against meddling, roomy service compartment with wide partitioned drawer, patented reversible broiler pan and fully insulated oven and broiler.

With the addition of Magic Chef Series 600, the Magic Chef dealer now has a complete line, nationally advertised, that satisfies every gas range buying requirement and provides every advantage needed to overcome competition.

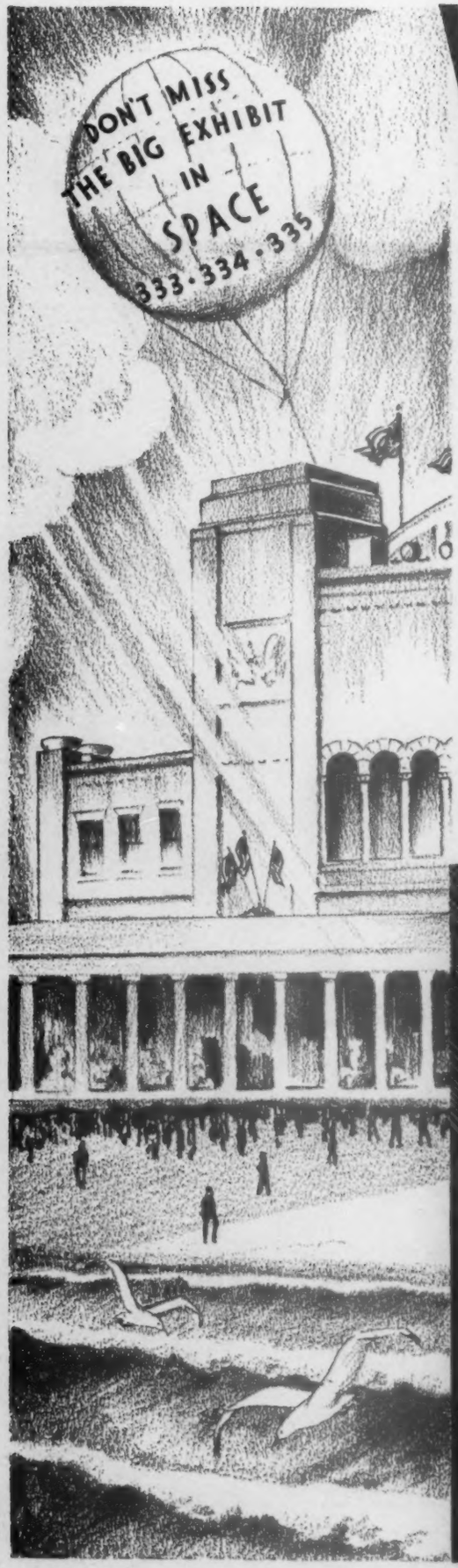


Unless it has a RED WHEEL
It is NOT a MAGIC CHEF

AMERICAN STOVE COMPANY

World's Largest Manufacturer of Gas Ranges

NEW YORK · PHILADELPHIA · ATLANTA · CLEVELAND
CHICAGO · ST. LOUIS · LOS ANGELES · SAN FRANCISCO



WELCOME

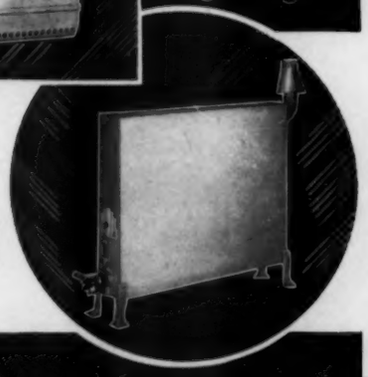
TO A.G.A. CONVENTION .. SURFACE COMBUSTION INVITES YOU TO VISIT ITS CONSTRUCTIVE EXHIBIT OF DOMESTIC AND COMMERCIAL GAS-FIRED EQUIPMENT . . . .

● **HEATMASTER... the modern gas-fired warm-air furnace... with complete air conditioning**

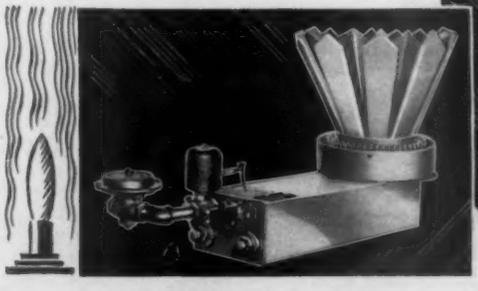
The A.G.A. Convention this year will emphasize more strongly than ever before the importance of house-heating in the great development program of the Gas Industry. Today gas for house-heating presents vast domestic load-building possibilities. The public has been thoroughly awakened to the comfort, convenience, health and cleanliness that Gas Heating alone can bring. Following closely this trend, Surface Combustion has developed and perfected warm-air furnaces that interpret to the utmost the advantages of gas as a fuel. In HEATMASTER and Columbus Furnace, Surface Combustion makes available to the Gas Industry the latest development in gas-fired warm-air furnace design . . . combining all the vital essentials of a modern heating system—controlled humidity—air motion—automatic heat—cleansed air. Surface Combustion's complete line of commercial and domestic gas-fired equipment will be exhibited at the convention . . . don't fail to visit this load-building display.

SC THRIFT Constant Demand Water Heater.

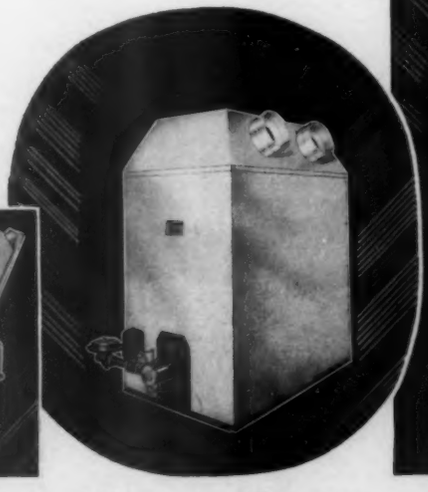
Surface Combustion gas-fired UNIT HEATER.



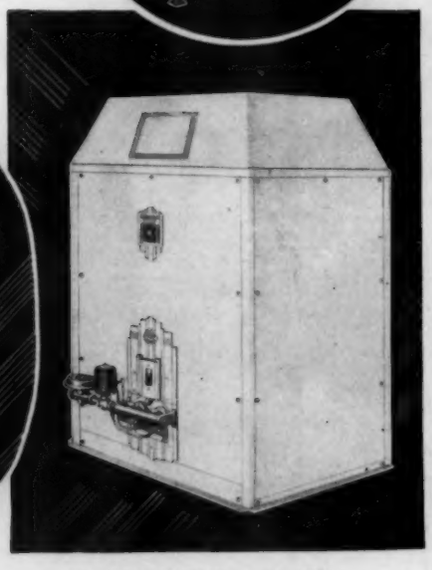
Surface Combustion gas-fired GARAGE HEATER.



JANITROL . . . the modern conversion burner.



Surface Combustion WARM-AIR FURNACE (Model W-1).



The COLUMBUS gas-fired Warm-Air Furnace.

Surface Combustion

SURFACE COMBUSTION CORPORATION . . . SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES
TOLEDO, OHIO

See the New 1932 KOMPAK

At Atlantic City

BOOTH 327

A New 24 Gallon KOMPAK for the Small Home

For the first time—a copper system at a reduced price—that will give unlimited hot water service for the small family at a lower cost for gas.

The marvelous circulation thermo. control increases the service—the lower gas consumption decreases the operating cost.

THE KOMPAK CO.

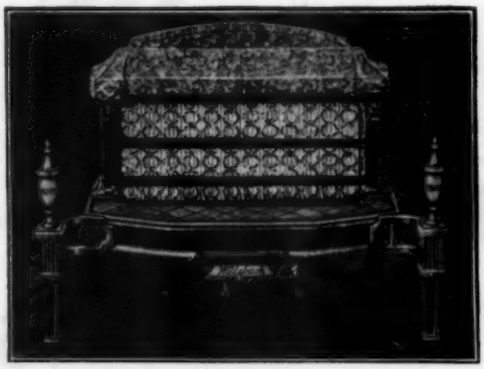
Automatic Thermostatic Gas Water Heaters

NEW BRUNSWICK

NEW JERSEY

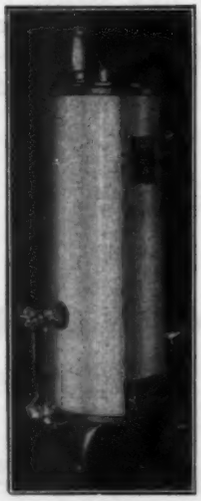
KOMPAK

Time proved value is of Key Importance in these days of Careful Buying



THESE are days of careful buying. Close scrutiny of value is the rule . . . And the name Welsbach, backed by 40 years of earned leadership in the gas appliance field, is recognized by Commercial Managers more fully than ever before as a definite factor in making sales...**Welsbach Radiant Heaters** are outstanding because of their original design and fine finish—yet are moderately priced . . . Welsbach quality is revealed in every detail of their construction.

Welsbach Water Heaters have gained their leadership through their efficient performance (and favorable prices). In fact there is not a single detail of any Welsbach appliance that will not bear close examination by today's buyers. When Welsbach gas appliances are featured, profitable sales are sure to result.



Member of American Gas Association

WELSBACH COMPANY

GLOUCESTER CITY, N. J.

Offices in Principal Cities

AT THE A. G. A. CONVENTION

AND SEE SENSATIONAL NEW 1932 GAS RANGE MODELS by ROPER

We'll be there to greet you and tell you how Roper is planning to make 1932 a prosperity year for gas range merchants—with the finest line in Roper history, breath-taking beauty, sales-making features, unprecedented values and selling helps:

M. P. Roper	E. A. Anderson	W. L. Plummer
W. E. Derwent	T. E. Rooke	J. C. Mansfield
C. J. Breen	J. H. Fagan	R. T. Bergh
W. J. Foster	H. F. Andrews	W. F. Gorham
F. France	W. S. Cadwallader	W. F. Carrott

ROPER
GAS RANGES

A. G. A. CONVENTION

Atlantic City *Oct. 12-16*

GEO. D. ROPER CORPORATION—ROCKFORD, ILLINOIS

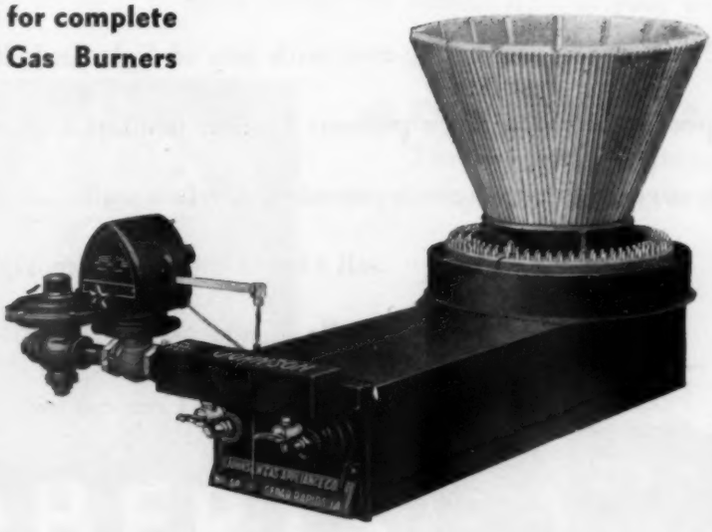
THERE'S STILL TIME

To get your share of this winter's gas heating business

Gas home heating isn't a coming thing—IT'S HERE. There are thousands of home owners who can be sold gas home heating this Fall—if you get busy. There are two kinds of buyers; those who want the best regardless of cost; and those who want something good at a popular price.

Johnson has built two complete lines of Gas Burners to cover both classes. The Johnson Automatic Gas Burner for home heating is built for those who want the best—and the Johnson Junior to satisfy the demand for a low priced burner.

There's still time. Write now for complete information on the Johnson Gas Burners for Home Heating.



JOHNSON GAS APPLIANCE CO.
Cedar Rapids JOHNSON PATENTED DIRECT JET **IOWA**

SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE

HERE..AT LAST ..MR. SALES MANAGER

is the **GAS RANGE** women have been asking and asking and asking for! **A SMART, NEW, CHEERFUL** gas range that fits into the kitchen like a gay china tea cup . . . a **LOW-PRICED** full size gas range that fits into the budget like a savings account bank book . . . We call this gas range the **"CHEERYCOOK"** . . . It is beautifully finished in two-tone green and ivory enamel . . . It has a hinged cover that hides the burners and provides a flat, handsome "table-top." A generous cooking-area with lots of light and elbow-room—no oven in the way. A big pot cupboard; a large pull-out broiler; insulated, enamel-lined oven; heat control, and a draft diverter that prevents streaked kitchen walls . . . Display these gas ranges—and you'll sell a lot of them. Write, right away, for illustrations and prices. . . .Be sure to see the S.G.E. exhibit of advanced gas range styles at the A.G.A. Convention. Spaces 423-4 and 506-7. Standard Gas Equipment Corp., 18 East 41st Street, New York City . . . Baltimore . . . Chicago . . . Boston . . . Birmingham.

SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE: SGE

The ROBERTSHAW *Means More to You*

THAN JUST A SELLING IDEA

Consider the position you are in, every time you sell a gas range.

Your customer asks you plenty of questions . . . . and you have to make plenty of promises . . . . as to how that range will perform in day-by-day cooking service.

But when you sell a range that has a Robertshaw, the matter of oven performance is answered and *assured* in advance.

You know that the woman who buys a Robertshaw equipped range is going to be most happy over the meals it cooks for her. You know, too, that she will accept the Robertshaw as a surety that the range is rightly made and strictly up-to-date.

And if you would sell more ranges this season, be sure you know how the Robertshaw advertising and radio campaign is creating new sales and prospects for you.

Write now for the complete Robertshaw program. It costs you nothing, and it does make range selling the easiest part of your work.

The
ROBERTSHAW
Thermostat Company
YOUNGWOOD · PENNSYLVANIA

ROBERTSHAW
AutomatiCook

THE GAS INDUSTRY *FORGES AHEAD*

as progressive builders choose

GAS REFRIGERATION!

ELECTROLUX KEEPS GAS IN THE LIMELIGHT OF PUBLIC ATTENTION—

DEMONSTRATES ADVANTAGES OF GAS TO BOTH BUILDER AND TENANT

Mr. Bernard Noonan, builder of Noonan Plaza.

YOU'D EXPECT AN APARTMENT LIKE THIS TEN YEARS FROM NOW—*but here it is today! Noonan Plaza, 105-145 West 168th St., N. Y. C. Has 285 apartments—also 1½ stores accessible from inside the building—every kitchen has Electrolux.*

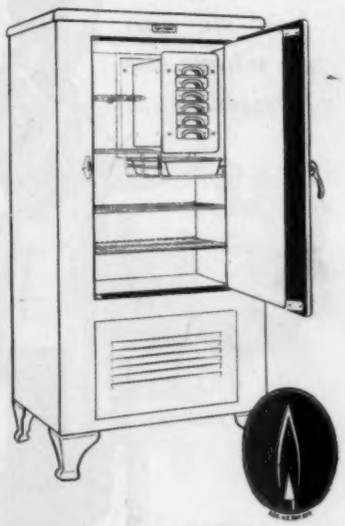
MR. BERNARD NOONAN builds apartments that are not only up-to-date now . . . but will be up-to-date ten years from now. That is why Noonan Plaza, his latest and greatest apartment, has roof gardens with playgrounds for children, co-operative ballrooms, moth-proof storage closets, solariums *and Electrolux Refrigerators.*

Gas refrigeration, the most up-to-date refrigeration, and the idea of gas as a modern fuel have been vividly brought home to Mr. Noonan. And as long as these leaders of the building industry regard gas as the fuel of the future, the gas industry will never take a back seat.

There are 285 Electrolux refrigerators installed in Noonan Plaza . . . 285 good-will builders for the gas industry. During the years thousands of tenants will find these gas refrigerators reliable and efficient. They, too, will have the modern use of gas firmly fixed in their minds. They will become better prospects for gas appliances. Should they buy their own homes, they are more likely to see the benefits of gas heating as well as those of gas refrigeration.

How to reach the apartment owner

To help you influence builders and owners the Electrolux sales department has prepared a carefully worked out plan. This plan as well as more general advertising material is available for the asking. Just write to Electrolux Refrigerator Sales, Inc., Evansville, Ind.



A tiny gas flame takes the place of all moving parts

ELECTROLUX THE *Gas* REFRIGERATOR

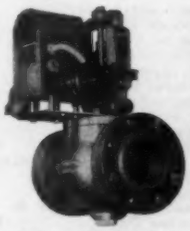
STAT-AMATIC

IS NOT SIMPLY SEMI-AUTOMATIC IT IS COMPLETELY AUTOMATIC

[Designed particularly for Gas Fired Furnaces]

Hundreds of home owners now know the satisfaction of Stat-Amatic temperature control.

Ideal for commercial and industrial buildings. When equipped with program dials Stat-Amatic provides "day" and "night" temperature levels throughout the week and automatically lowers temperature over the week end.



Stat-Amatic Motorized Valve (up to 10") Rugged, ample reserve power, compact. For use for zone and sectional control.

Dual Control Thermostat. Bakelite case. Attractive in appearance.

IT IS A BOON TO SALES. IT ASSURES CUSTOMER SATISFACTION. IT PROVIDES THE LAST WORD OF CONTROL FOR GAS, THE IDEAL FUEL, BECAUSE IT IS

COMPLETELY AUTOMATIC

Stat-Amatic Motor Wound Clock AUTOMATICALLY shifts from a 'day' to a 'night' temperature and vice versa. Stat-Amatic Automatically reduces to and holds the economically lower 'night' temperature over week ends or holidays, switching back to the desired temperature immediately after the 'hold-over' period.

And if the electric current is temporarily interrupted, the motor wound Stat-Amatic clock will continue to operate for many hours. This feature, of course, makes unnecessary the bothersome and costly service calls for re-regulation that would otherwise result.

Stat-Amatic pioneered and set a new standard of control and has maintained this standard. Now you can say to your prospective customers: "This Gas Furnace is Automatically Controlled, not simply semi-automatically controlled."

It is but natural to expect that, eventually, the remarkable efficiency of Stat-Amatic will prompt the offering of some device attempting to accomplish similar results. "Superiority always induces imitation."—Drayden.

STAT-AMATIC INSTRUMENT & APPLIANCE CO.

HARTFORD, CONN.

SEND THIS TODAY—

Stat-Amatic Instrument & Appliance Company
Hartford, Conn. GJ. 4

We want more information about Stat-Amatic for Gas Furnaces.

.....
company

.....
individual title

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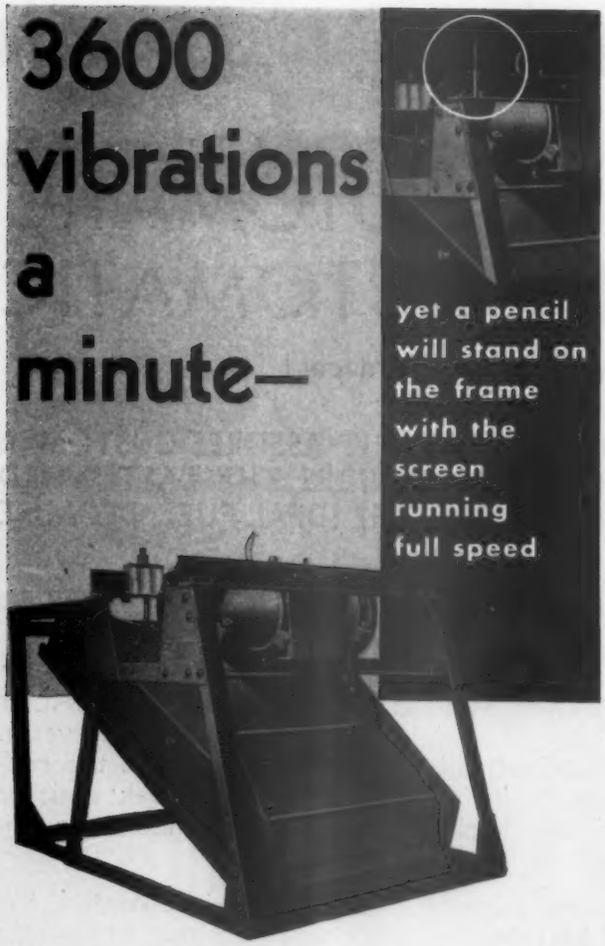
address

SEE US AT ATLANTIC CITY

OCT. 12 to 16, 1931

AT BOOTH 735

3600 vibrations a minute—



Screens anything screenable—wet or dry. Scores of prominent Mitchell screen users have reordered repeatedly.

Bulletin 28-2 and list of users on request.

60 vibrations in the tick of your watch!—3600 a minute—plus double action—horizontal and vertical—resulting in a circular sifting effect—these give the Mitchell its extraordinary screening and sizing speed.

Mitchell design transmits all vibrations to the screen cloth. None is lost or absorbed by the supporting frame. A pencil will stand on end on the frame while the screen is running!

And no belt or chain drives to cause trouble.

See it in operation at Booth 202 A G A Convention

MITCHELL
ELECTRIC
VIBRATING SCREEN

Consider that in terms of long life and a good investment. Prices are at low levels.

C.W. HUNT CO.
DIVISION, GIFFORD-WOOD CO.

565 W. Washington St.
Chicago

Graybar Building
New York

1587

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Published by manufacturers of Gas Equipment and Appliances for you. Order by number, using coupon on Page 114.

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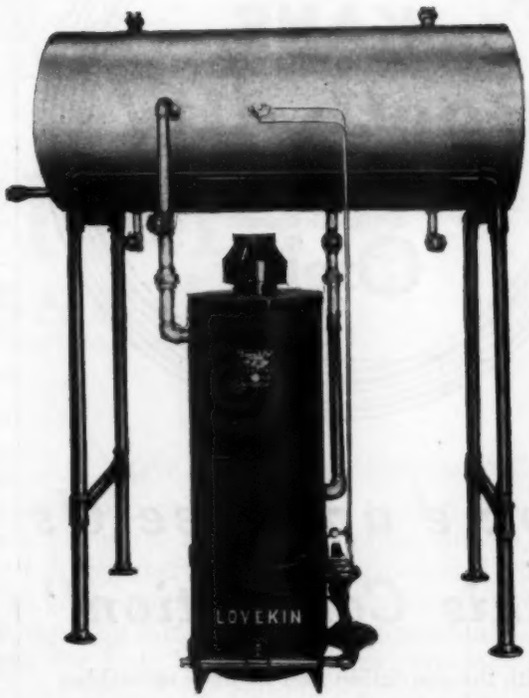
Republic Steel Corpn. 626
"AMERICAN" GAS AND METER TESTING APPARATUS
American Meter Co. 320
AUTOMATIC GOVERNORS
Connelly Iron Sponge & Governor Co. 289
BALANCE GOVERNORS
Connelly Iron Sponge & Governor Co. 290
BACK PRESSURE VALVES
Connelly Iron Sponge & Governor Co. 295
BECKER TYPE COMBUSTION COKE & GAS OVENS
The Koppers Construction Co. 235
BECKER TYPE BY-PRODUCT COKE AND GAS PLANTS
The Koppers Construction Co. 477
B. H. CO. THICKENER
The Bartlett Hayward Co. 56
B. H. CO. VERTICAL SCRUBBER
The Bartlett Hayward Co. 57
BLAST GATE
Western Gas Construction Co. 580
BOILER FEED PUMPS
P. M. Lattner Mfg. Co. 478
"BULLETS"—HOLDERS
Stacey Bros. Gas Construction Co. 516
BUTTERFLY VALVES
Western Gas Construction Co. 450
BUTANE PLANT EQUIPMENT
Philfuels Co. 510
BUTANE GAS PLANT CONTROL
Cutler Hammer, Inc. 631
CALORIMETRY
American Meter Co. 321
CALOROPTIC, THE
Connelly Iron Sponge & Governor Co. 511
CHEMICAL ANALYSIS OF GAS PURIFYING MATERIALS
E. J. Lavino & Co. 455
CHEMISTRY AND PHYSICS OF THE COMBUSTION OF GASEOUS FUELS
E. J. Lavino & Co. 456
COAL PRODUCTS TREE
The Koppers Construction Co. 234
COKE FIRED GAS PRODUCER OPERATION
The Koppers Construction Co 236
CONNELLY COMBINATION VALVE
Connelly Iron Sponge & Governor Co. 610
CONTINUOUS VERTICAL COMBINATION OVENS
The Koppers Construction Company 238
CONTROL MECHANICAL APPARATUS
Western Gas Construction Co. 581
COOPER-BESSEMER NEW TYPE COMPRESSOR UNIT
Cooper-Bessemer Co. 517
COOPER-BESSEMER VERTICAL GAS ENGINES
Cooper-Bessemer Co. 518
COOPER-BESSEMER GAS AND OIL ENGINES
Cooper-Bessemer Co. 519
COOPER COMPRESSOR UNIT
Cooper Bessemer Co. 520
CORRUGATED TRANSITE
Johns-Manville 601
"COUNTER BALANCE MANHOLES
Connelly Iron Sponge & Governor Co. 299
DECOMPOSITION METERS
Western Gas Construction Co. 582
DE FLOREZ REMOTE MANUAL CONTROL SYSTEM
Brown Instrument Co. 452
DEHYDRATION OF MANUFACTURED GAS
Western Gas Construction Co. 583
The Koppers Construction Co. 237
DISTRICT L. C. GOVERNORS
Connelly Iron Sponge & Governor Co. 293
DR. OTT-LUX-GAS TESTER
The Alpha Lux Co., Inc. 23
DUPLEX VALVES
Andale Co. 43
EASY'S FLEXIBLE COUPLING
The Bartlett Hayward Co 54
FORGED STEEL GATE VALVES
Darling Valve & Mfg. Co 20
FULTON DEAD WEIGHT SAFETY VALVES
Chaplin-Fulton Mfg. Co. 480
FULTON LEVER SAFETY VALVES
Chaplin-Fulton Mfg. Co. 479
GAS CONDENSERS
Isbell Porter Co. 140
GAS COOLER
Andale Co 46
GAS DISTRIBUTION
The U. G. I. Contracting Co. 76
GAS ENGINE DRIVEN COMPRESSOR UNITS
Cooper-Bessemer Corpn. 503
GAS FILTERS
American Meter Co. 322
GAS PURIFICATION PROCESS
Western Gas Construction Co. 585
GAS HOLDERS—HIGH AND LOW PRESSURE
Stacey Mfg. Co. 579
GAS MEASUREMENT
American Meter Co. 323
GATE VALVES
Western Gas Construction Co. 586
GAS WORKS APPARATUS AND EQUIPMENT
Connelly Iron Sponge & Governor Co. 627
HAND COLORIMETER
The Alpha Lux Co. Inc. 22
HIGH EFFICIENCY GAS CONDENSERS
Isbell Porter Co. 137
HIGH PRESSURE TOWER
Western Gas Construction Co. 587
HOWARD CHARGER
The Western Gas Construction Co. 37
HIGH TEST WELDING ROD
Union Carbide & Carbon Corpn. 255
HIGH PRESSURE GAS HOLDERS
Western Gas Construction Co. 590
JET PHOTOMETERS
Connelly Iron Sponge & Governor Co. 294
JOHNS-MANVILL SERVICE TO THE POWER PLANT
Johns-Manville 602
KEEPING UP WITH INDUSTRY
Cruse Kemper Co. 457
KENNEDY AUTOMATIC CONTROL
The Bartlett Hayward Co. 55
KOPPERS COMPANY'S COAL GAS PLANTS, THE
The Koppers Construction Co. 240
LABORATORY APPARATUS
American Meter Co. 324
Superior Meter Co. 521
LIQUID PURIFICATION
The Western Gas Construction Co. 85
LUX RECORDING GAUGE
The Alpha Lux Co., Inc. 21
MACKENZIE EXHAUSTERS
Isbell Porter Co. 141
MANUAL OF DRY BOX PURIFICATION
E. J. Lavino and Co. 276
MERCURY SEAL GOVERNORS
Connelly Iron Sponge & Governor Co. 291
METERS, GAS
American Meter Co. 326
Superior Meter Co. 522
"METRIC" IRONCASE METERS
American Meter Co. 325
MITCHELL ELECTRIC VIBRATING SCREENS
C. W. Hunt Co., Inc. 229
NAPHTHALENE ABSORPTION PLANTS
The Western Gas Construction Co. 84
NEW APPARATUS FOR THE REMOVAL OF NAPHTHALENE AND GUM FORMING CONSTITUENTS FROM GAS
The Koppers Construction Co 241
NEW AND IMPROVED COOPER GAS ENGINE COMPRESSOR
Cooper Bessemer Corpn. 523
NEW METHOD OF GAS PURIFICATION
The Koppers Construction Co. 241
OBSERVATION ON LUX-MATERIAL
The Alpha Lux Co., Inc. 24
ORIFICE METERS
American Meter Co. 327

(Continued on page 108)

ANNOUNCING



The NEW LOVEKIN

MULTI-TUBE STORAGE SYSTEM

Volume water heaters for industrial and commercial institutions (and large homes) that embody the same successful and exclusive principle of multiple tubular construction used in the domestic size Lovekin. These new heaters are built with heating capacities of 150, 250 and 350 gallons per hour and, as pictured, consist of two separate units—heater and storage tank, many combinations of which are available.

With gas the ideal fuel for water heating and with the Lovekin principle of heat transfer the most efficient yet devised, a brilliant future for the new "larger brother" is assured.

Heaters and storage tanks are furnished in Everdur copper, as well as galvanized steel.

THE LOVEKIN WATER HEATER COMPANY

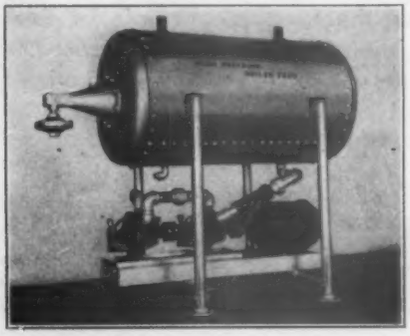
NEW YORK PHILADELPHIA CHICAGO

KANE
Booth 416!
Steam in 4 minutes
Ofeldt

"Come and See Us at this Convention"

It is with the conviction that we have something of interest for you that we cordially invite you to visit Booth 416 at this year's American Gas Association Convention.

Here you will see KANE and OFELDT boilers, of course, and the M-K-O Automatic Boiler Feed unit. But the interest in the mechanical display is in its ultimate effect upon your gas sales. Booth 416, then, is designed to stimulate and create sales ideas for you. *Come and see us at this convention!*



The M-K-O Automatic Boiler Feed and Return System.

MEARS-KANE-OFELDT

Executive Offices and Factory
1903-1915 EAST HAGERT ST., PHILADELPHIA
Branch Offices or Distributors in Principal Cities

TRADE CATALOGS

(Continued from page 106)

PIPE—TONCAN IRON
Republic Steel Corp. 454
PRESSURE GAUGES
Connelly Iron Sponge & Governor Co. 296
American Meter Co. 378
Superior Meter Co. 525
PRESSURE VACUUM RELIEF VALVE FOR STORAGE TANKS
International-Stacey Corpn. 642
PURIFICATION OF OPEN HEARTH FUEL GAS, THE
The Koppers Construction Co. 239
PURIFICATION OF NATURAL GAS & REFINERY GASES FROM HYDROGEN SULPHIDE
Western Gas Construction Co. 588
RELIANCE SERVICE REGULATORS
Isbell Porter Co. 139
ROADLESS BARROWS
Isbell Porter Co 135
ROTARY SELF-CLEANING STRAINER
Andale Co. 47
SECTIONAL SIDE-WALL CONSTRUCTION
International-Stacey Corpn. 643
SERVICE CLEANERS
American Meter Co. 329
Superior Meter Co. 521
SERVICE GOVERNORS
Connelly Iron Sponge & Governor Co 292
SERVICE D. C. GOVERNORS
Connelly Iron Sponge & Governor Co. 294
SHAVING SCRUBBERS
Isbell Porter Co. 138
SHEET IRON A PRIMER
Republic Steel Corpn. 628
SMOOT CONTROL OF COMBUSTION AS APPLIED TO TRAVELING GRATE STOKERS
Smoot Engineering Corpn. 66
SMOOT CONTROL AS APPLIED TO UNDERFEED STOKERS
Smoot Engineering Corpn. 6
SMOOT CONTROL AS APPLIED TO WATER GAS SETS
Smoot Engineering Corpn. 69
SMOOT STEAM ACCUMULATOR AND CONTROL SYSTEM
Smoot Engineering Corpn. 66
SPECIFICATIONS ON HIGH AND LOW PRESSURE HOLDERS
The Stacey Bros. Gas Constrn. Co. 74
"STACEY BULLET"
The Stacey Bros. Gas Constrn. Co. 73
STACEY-KLONNE DRY GAS HOLDERS
Stacey Bros. Constrn. Co. 644
STANDARD HOLDERS FOR LOW PRESSURE STORAGE
Western Gas Construction Co. 580
STANDARD STEEL BUILDINGS
International-Stacey Corpn. 645
STEEL DERRICKS AND ACCESSORIES
International-Stacey Corpn. 646
STREET DEPARTMENT TOOLS
Connelly Iron Sponge & Governor Co. 297
STREET MAIN GOVERNORS
Isbell Porter Co. 134
THROTTLE GOVERNORS & COMPENSATORS
Isbell Porter Co 141
U. G. I. BARRING DOWN MACHINE, THE
The U. G. I. Contracting Co. 77
U. G. I. INTERMITTENT CHAMBER OVENS
The U. G. I. Contracting Co. 75
U. G. I. MECHANICAL GENERATOR AND CHARGER, THE
The U. G. I. Contracting Co. 79
U. G. I. MODEL "B" AUTOMATIC CONTROL, THE
The U. G. I. Contracting Co. 78
VALVES
The Western Gas Construction Co. 86
VALVES & SPECIALS
Isbell Porter Co. 144
VALVES
Darling Valve & Mfg. Co. 35
VERTICAL GAS ENGINES
Cooper-Bessemer Corpn. 504
WATER GAS
The Western Gas Construction Co. 89
WATERLESS GAS HOLDERS
The Bartlett Hayward Co. 58
WEST GAS
West Gas Improvement Co. 175
PUMPS FOR GAS PLANTS
Geo. D. Roper Corpn. 483
R-C-W STANDARD DUTY GAS PUMPS
Roots-Connersville-Wilbraham 636
ROTARY DISPLACEMENT METERS
The Connersville Blower Co. 59
R-C-W HEAVY DUTY GAS PUMPS
Roots-Connersville-Wilbraham 647
STANDARD HOLDERS FOR LOW PRESSURE STORAGE
Stacey Mfg. Co. 424
HIGH PRESSURE GAS HOLDERS
Stacey Mfg. Co. 425

INSTRUMENTS

BRISTOL'S AIR OPERATED CONTROLLERS
The Bristol Co. 122
BRISTOL'S AUTOMATIC ELECTRIC CONTROL VALVES
The Bristol Co. 126
BROWN AUTOMATIC TEMPERATURE CONTROL CATALOG
The Brown Instrument Co. 166
BROWN ELECTRIC FLOW METER CATALOG
The Brown Instrument Co. 170
BROWN REMOTE TYPE INSTRUMENTS
Brown Instrument Co. 427
BRISTOL AUTOMATIC TEMPERATURE CONTROL CATALOG ON GAS FIRED BAKING OVEN
Bristol Co. 498
BRISTOL'S LONG DISTANCE TRANSMITTING GAUGES
The Bristol Co. 129
BRISTOL'S PYROMETERS
The Bristol Co. 130
BROWN PYROMETER CATALOG
The Brown Instrument Co. 171
BRISTOLS PYROMETER CONTROLLERS
The Bristol Co. 123
BRISTOLS RECORDING BAROMETERS
The Bristol Co. 125
BRISTOL'S RECORDING LIQUID LEVEL GAUGES
The Bristol Co. 128
BRISTOL'S RECORDING MILLIVOLTMETERS FOR ELECTROLYSIS SURVEYS
The Bristol Co. 127
BRISTOL'S RECORDING PRESSURE & VACUUM GAUGES
The Bristol Co. 131
BRISTOL RECORDING PSYCHROMETERS
The Bristol Co. 301
BRISTOL'S TEMPERATURE CONTROLLERS
The Bristol Co. 124
BRISTOL'S RECORDING THERMOMETERS
The Bristol Company 132
THE ERA OF AUTOMATIC CONTROL
Brown Instrument Co. 502
"GOOD FURNACES—GOOD MEN—YET WE'RE SUNK ON OUR HEAT TREATING COSTS"
Brown Instrument Co. 550
MEETING YOUR IDEAS ON THE FLOW PROBLEM
The Brown Instrument Co. 164
PARTLOW TEMPERATURE CONTROLS
Partlow Corpn. 482
PRESSURE GAUGE CATALOG
The Brown Instrument Co. 169
RECORDING DEMAND FOR GAS METERS
American Meter Co. 330
RECORDING THERMOMETERS CATALOG
The Brown Instrument Co. 168
RESISTANCE THERMOMETERS CATALOG
The Brown Instrument Co. 167
TYCOS INSTRUMENTS FOR GAS PLANTS
Taylor Instrument Companies 542

REGULATORS

AUTOMATIC GAS BURNING EQUIPMENT
Partlow Corpn. 470
AUTOMATIC TEMPERATURE CONTROLS
Partlow Corpn. 471
AUTOMATIC TEMPERATURE INDICATING CONTACTOR
Partlow Corpn. 472
AUTOMATIC TRUCK-CLOSING ANTI-VACUUM VALVE
Reynolds Gas Regulator Co. 282
BARBER SUPERIOR GAS PRESSURE REGULATORS
The Barber Gas Burner Co. 604

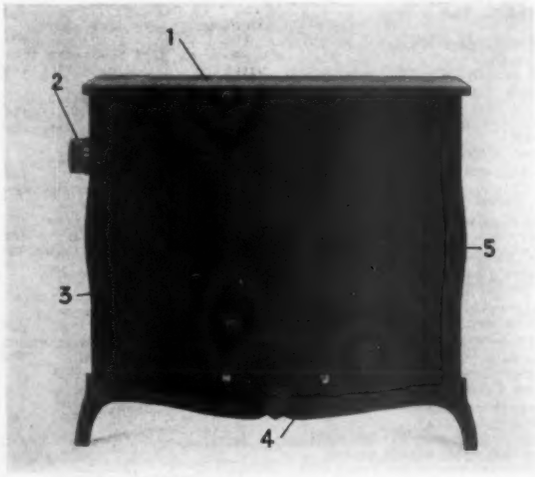
(Continued on page 110)

Announcing

HUMPHREY PRODUCT

The HUMPHREY Ambassador

AUTOMATIC GAS-ELECTRIC HEATER



1—Heavy gauge shielded steel cabinet. 2—Thermostat. 3—Room air intake grill. 4—Pilot port. 5—Warm air outlet—fan-forced circulation.

NOW the famous Humphrey Gas Unit heating principle has been applied successfully in a beautiful heater for homes, offices, stores, and shops, and once again the General Gas Light Company opens a new gas market for you. The Humphrey Ambassador is an auxiliary heating unit for Fall, Spring and the extremes of Winter, as well as for complete house heating in the warmer climates. It is entirely automatic, with self-contained thermostatic control, fan-forced combustion and warm air circulation to bring instant uniform heat throughout the room in which it operates.

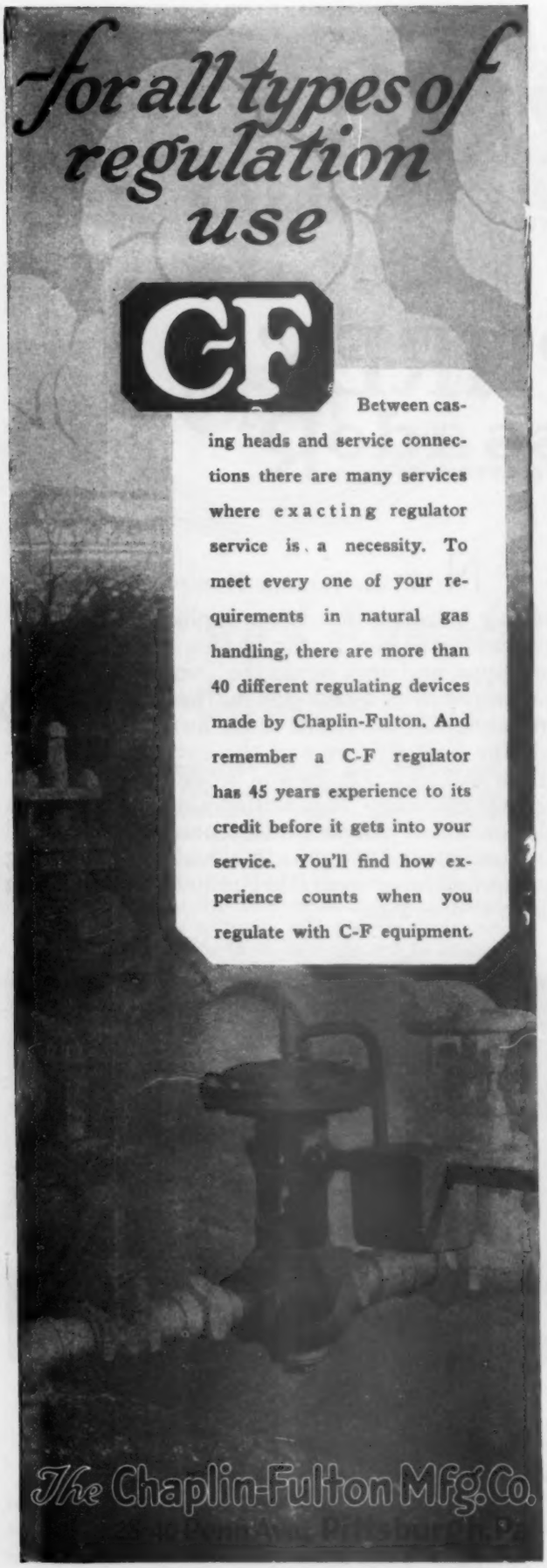
NOTE how well the artistic design blends with home furnishings. In every respect the Humphrey Ambassador adds to the comfort, economy, and satisfaction of its owners.

Great profits are in store for you in the Humphrey Ambassador. It will be displayed at the A. G. A. Convention, Atlantic City, Booth 726-729. Whether you plan to attend or not, be sure to send today for complete information about this new Humphrey creation.

General Gas Light Company
Kalamazoo, Michigan

44 West Broadway
New York

135 Bluxome Street
San Francisco


for all types of regulation use
C-F
Between casing heads and service connections there are many services where exacting regulator service is a necessity. To meet every one of your requirements in natural gas handling, there are more than 40 different regulating devices made by Chaplin-Fulton. And remember a C-F regulator has 45 years experience to its credit before it gets into your service. You'll find how experience counts when you regulate with C-F equipment.
The Chaplin-Fulton Mfg. Co.

TRADE CATALOGS

(Continued from page 108)

BOTTLED GAS AN ALLY OF THE GAS INDUSTRY
Sprague Meter Co. 306
FULTON GAS FUEL BOILER GOVERNOR
The Chaplin Fulton Mfg. Co. 248
FULTON GAS REGULATOR CATALOGUE
The Chaplin Fulton Mfg. Co. 247
HIGH PRESSURE LINE REGULATORS AND HIGH PRESSURE RELIEF VALVES
Reynolds Gas Regulator Co. 278
HIGH PRESSURE SERVICE REGULATORS
Reynolds Gas Regulator Co. 279
LINOTYPE AND MONOTYPE TEMPERATURE CONTROL
Partlow Corpn. 473
LITTLE GIANT HOUSE REGULATOR
Reynolds Gas Regulator Co. 283
LOW PRESSURE SERVICE REGULATORS
Reynolds Gas Regulator Co. 281
METAL MELTING POT TEMPERATURE CONTROL CIRCULAR
Partlow Corpn. 474
METER HANGER CATALOG
Mueller Co. 2
PERFORMANCE IS PROOF
Grobie Gas Regulator Co. 175
POCKET HAND BOOK—DIRECTIONS FOR SETTING AND OPERATING FULTON GAS REGULATORS
The Chaplin Fulton Mfg. Co. 249
REGULATOR CATALOG
Mueller Co. 3
REGULATOR CATALOG
Reynolds Gas Regulator Co. 37
REGULATORS FOR HIGH & MEDIUM PRESSURES
Sprague Meter Co. 225
RELIANCE BALANCE VALVE DISTRICT REGULATOR
Isbell Porter Co. 133
SINGLE DISTRICT & DOUBLE DISTRICT REGULATORS
Isbell Porter Co. 136
Reynolds Gas Regulator Co. 280
SAFETY GAS VALVE AND PILOT WITH LOW WATER SHUT OFF
Partlow Corpn. 475
SINGLE- DOUBLE- AND QUADRUPLET SAFETY GAS VALVE AND PILOT
Partlow Corpn. 476
FULTON HOUSE REGULATOR
FULTON SPRING REGULATOR
FULTON VACUUM RELIEF VALVES
FULTON DIFFERENTIAL RELIEF VALVES
FULTON DIFFERENTIAL REGULATORS
FULTON DIFFERENTIAL GAS RELIEF VALVES
FULTON BLOWGAS REGULATORS
FULTON LEVER SAFETY VALVES
FULTON DUPLEX VACUUM OR BACK PRESSURE REGULATOR
FULTON BACK PRESSURE REGULATORS
FULTON THROTTLING REGULATORS
FULTON COMPRESSOR REGULATORS
FULTON HIGH PRESSURE REGULATORS
FULTON LOW PRESSURE REGULATORS
FULTON CUTOUT LATCH REGULATOR
FULTON DEAD WEIGHT REGULATOR
FULTON DUPLEX SENSITIVE GAS GOVERNOR
The Chaplin Fulton Mfg. Co. 611

REFRACTORIES

CEMENTING JAMP JOINTS
Quigley Company 159
CHOOSING A HIGH TEMPERATURE CEMENT
HIGH TEMPERATURE CEMENT IN THE GAS PLANT
Quigley Company 158
HOT PATCHING RETORTS
Quigley Company 160
HYTEMPITE IN THE GAS PLANT
Quigley Company 163
HYTEMPITE IN THE POWER PLANT
Quigley Company 408
PROTECT YOUR PLANT & EQUIPMENT —A PROTECTIVE COATING
Quigley Company 161
PROPERTIES AND USES OF KROMEPATCH
E. J. Lavino & Co. 458
QUICK CARBURETOR REPAIRS MADE HYTEMVITE
Quigley Company 157
QUIGLEY REFRACTORY GUN, THE
Quigley Company 162
QUIGLEY ACID PROOF CEMENT
Quigley Company 310

PIPE

AUTOGENOUS WELDING OF NATIONAL PIPE
National Tube Co. 411
BELL & SPIGOT REPAIR CLAMPS
S. R. Dresser Mfg. Co. 612
CAST IRON PIPE
United States Cast Iron Pipe & Foundry Co. 149
CAST IRON PIPE & FITTINGS
McWane Cast Iron Pipe Co. 203
COUPLINGS AND SPECIALTIES FOR NATURAL GAS
S. R. Dresser Mfg. Co. 43
COUPLINGS FOR MANUFACTURED GAS MAINS
S. R. Dresser Mfg. Co. 42
COUPLINGS FOR PLAIN END PIPE
S. R. Dresser Mfg. Co. 613
FOR EVERY JOINT ON THE LINE
Victaulic Co. of Amer. 13
WESTLING VALVE
Bartlett Hayward Co. 275
WOODALL-DUCKHAM VERTICAL RETORTS
Isbell Porter Co. 143
PIPE CATALOG, GENERAL
McWane Cast Iron Pipe Co. 483
SMALL PIPE CATALOG
McWane Cast Iron Pipe Co. 484
HANDBOOK OF CAST IRON PIPE (DISTRIBUTED TO GAS OFFICIALS AND ENGINEERS ONLY)
Cast Iron Pipe Research Assn. 178
HANDBOOK OF CAST IRON PIPE FOR GAS SERVICE
United States Cast Iron Pipe & Foundry Co. 148
HANDBOOK OF DE LAVAUD CENTRIFUGALLY CAST IRON PIPE
United States Cast Iron Pipe and Foundry Co. 144
SAFEGUARDING YOUR PIPE LINE INVESTMENT
Johns Manville
SEMET SOLVAY PIPING AND VALVES
Semet Solvay Engineering Corpn. 614
TONCAN IRON PIPE FOR PERMANENCE
Republic Steel Corpn. 629

BLOWERS

VICTOR-ACME BLOWERS
Roots-Connersville-Wilbraham 641
CONNERSVILLE CYCLOIDAL PUMPS
The Connersville Blower Co. 333
R-C-W HEAVY DUTY BLOWERS
Roots-Connersville-Wilbraham 634
R-C-W STANDARD DUTY (TYPE SD) BLOWERS
Roots-Connersville-Wilbraham 633

PIPE (Coatings, Couplings, Joints Welding Equipment)

JOINTS ON DE LAVAUD CAST IRON PIPE FOR GAS SERVICE
United States Cast Iron Pipe and Foundry Co. 147
"FOR EVERY JOINT ON THE LINE"
Victaulic Co. 499
PIPE COUPLINGS
Victaulic Co. of Amer. 14
STEEL PIPE COUPLINGS
S. R. Dresser Mfg. Co. 41
STREET DEPARTMENT SUPPLIES
Safety Gas Main Stopper Co. 261
HIGH TEST WELDING ROD
The Linde Air Products Co. 82
JOINT SEALING COMPOUND
Quigley Company, Inc. 485
LONG PIPE LINES WITH OXWELDED JOINTS
The Linde Air Products Co. 81
OXWELD
The Linde Air Products Co. 81
OXY-ACETYLENE TIPS
The Linde Air Products Co. 80

(Continued on page 112)

Forty-Niners

No. 1 of a Series of Advertisements, "Seasoned by Time"

IN 1849, Conestoga wagons streamed across Western plains in the gold rush to California. In 1849 throughout the East, gas challenged the supremacy of whale oil in lighting.

Pioneer gas companies operating in that year of the Forty-Niners included **Rochester Gas Light Company** and **Worcester Gas Light Company**—both part of the Associated System. Among other Associated gas companies and the years they were founded, are those serving—

Easton, Pa.	**1850**
New Bedford, Mass. .	**1850**
Ithaca, New York . .	**1852**
Elmira, New York . .	**1852**
Cambridge, Mass. . .	**1852**
Corning, New York .	**1856**
Johnstown, Pa. . . .	**1856**
Owensboro, Ky. . . .	**1860**

Companies Average 79 Years

These companies are no longer doubtful experiments. ***Seasoned by time***, they have have established over an average of 79 years their ability to operate successfully. They stood up bravely during dark days when the gas industry was said to be headed for the scrap heap . . . they co-operated in research that gave new uses and new youth to the industry . . . they are ready now to share in the growth that lies just ahead.

1849-Worcester Gas Plant

This expansion lies in domestic uses such as water heating, home heating, refrigeration, and wider use by the commercial field including retail establishments. In the industrial field, where gas supplies the need for accurately controlled heat, it is estimated that gas plants now supply only 10% of the load available.

A Quarter Century of Group Management

Associated properties will be aided in this advance by group management established over a quarter century. The Associated System is one of the first five utility groups organized in the country. Its chief executives average 24 years of ***seasoned experience*** with these properties. Group management is enabling gas and electricity to make the swift progress being achieved.

Long records of successful operation by Associated properties combined with the advantages of a quarter century of group management are the best assurances of continued progress by the Associated System.

For information about Associated System facilities, service and rates, write

Associated Gas & Electric System

61 Broadway **New York**

Byllesby Engineering

and Management Corporation

Wholly-owned subsidiary of

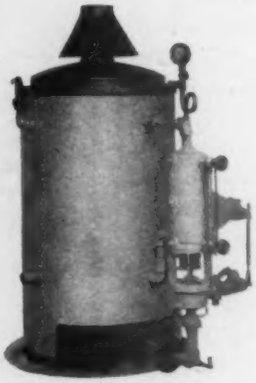
Standard Gas and Electric Company

231 South La Salle Street, Chicago

New York Pittsburgh San Francisco

LATTNER

FLUELESS
Industrial Gas
BOILERS



3 H. P.
H. E. Flueless.

High efficiency.

100% boilers in sizes ¾ to 5 H.P. inclusive.

No flue trouble—no coil trouble.

Patented construction. A heavy insulated jacket is a built in feature. Equipped with automatic gas control and low water gas cut-off. Full information on request.

P.M. LATTNER MFG. CO.

Cedar Rapids, Iowa

516 12th Ave. S. W.

TRADE CATALOGS

(Continued from page 110)

METERS

APPARATUS BULLETINS
American Meter Co. 110
CAST IRON GAS METERS
Sprague Meter Co. 284
DISPLACEMENT AND ORIFICE MEAS-
EMCO STANDARD DOMESTIC AND CURB BOX METERS
Pittsburgh Equitable Meter 410
EMCO TIN METER
Pittsburgh Equitable Meter Co. 268
EMCO NO. 5 LARGE CAPACITY PRESSED STEEL GAS METER
Pittsburgh Equitable Meter Co. 269
EMCO DEMAND METER
Pittsburgh Equitable Meter Co 266
EMCO LARGE CAPACITY POSITIVE GAS METERS
Pittsburgh Equitable Meter Co. 260
MONEL WET TYPE METERS
Superior Meter Co. 223
INSTRUCTIONS FOR CONNERSVILLE TANDEM METERS
The Connersville Blower Co. 337
INSTRUCTION FOR THE INSTALLATION AND OPERATION OF CONNERSVILLE ROTARY DISPLACEMENT METERS
Connersville Blower Co. 341
INSTRUCTIONS FOR THE MAXIMUM DEMAND RECORDER
The Connersville Blower Co. 336
INSTRUCTIONS FOR THE USE OF THE P. V. T. T. RECORDING GAUGE
The Connersville Blower Co. 342
IRONCLAD CAST IRON DRY GAS METER
Pittsburgh Equitable Meter Co. 264
DREADNAUGHT TYPE METERS
Sprague Meter Co. 227
GAS METERS AND APPARATUS
Lambert Meter Co., Inc. 173
American Meter Co. 338
Superior Meter Co. 527
INSTRUCTIONS FOR THE PROVING AND TESTING OF METERS
American Meter Co. 120
Superior Meter Co. 528
LINDERMAN LARGE VOLUME GAS METERS
American Meter Co. 339
METER CATALOG
American Meter Co. 121
METERS AND DIAPHRAGMS
Superior Meter Co. 224
"METRIC" FLOW METERS
American Meter Co. 343
RECORDING DEMAND FLOWMETER
Lambert Meter Co. 175
DEMAND GAS METERS
Bulletin 13—Sprague Meter Co. 303
"WESTCOTT" ORIFICE METERS
American Meter Co. 344
SPRAGUE LINE OF LOW PRESSURE REGULATORS
Sprague Meter Co. 488
RECHROME AND OILED METER LEATHERS
Besse Osborne & Odell 570

MISCELLANEOUS

CLEVELAND TRENCHERS
Cleveland Trencher Co. 417
ADJUSTABLE CYLINDER METER HANGERS
Mueller Co. 489
CLEANING COMPOUND ANNITE
Quigley Co., Inc. 490
BITUMEN HEATERS
Mohawk Asphalt Heater Co. 571
LEAD & COMPOUND MELTING FURNACES
Mohawk Asphalt Heater Co. 572
PIPE DIPPING TROUGHS
Mohawk Asphalt Heater Co. 573
OIL BURNING TORCHES
Mohawk Asphalt Heater Co. 574
COMBINATION TOOL ASPHALT & SURFACE HEATERS
Mohawk Asphalt Heater Co. 575
KROMEPATCH IS USED IN ALL INDUSTRIES
E. J. Lavino & Co. 615
MOHAWK HI-SPEED TRADER TOOL CHART
Mohawk Asphalt Heater Co. 576
MOHAWK HI-SPEED UTILITY TRAILERS, 2 AND 4 WHEEL
Mohawk Asphalt Heater Co. 577
CORK DIPPING PANS
Mohawk Asphalt Heater Co. 578
STREET DEPARTMENT SUPPLIES
Safety Gas Main Stopper Co. 616
GOODMAN CYLINDRICAL STOPPERS
Safety Gas Main Stopper Co. 617
GOODMAN GAS MAIN STOPPERS
Safety Gas Main Stopper Co. 618
GAS MAIN BAGS
Safety Gas Main Stopper Co. 619
SAFETY SERVICE PLUGS
Safety Gas Main Stopper Co. 620
PIPE CLEANING BRUSHES
Safety Gas Main Stopper Co. 620
GARDNER-GOODMAN STOPPER
Safety Gas Main Stopper Co. 621

Gas Appliances

INDUSTRIAL EQUIPMENT

AIR HEATER BULLETIN
Surface Combustion Co. 505
RIVET HEATERS
Surface Combustion Co. 506
POTATO CHIP FURNACES
Surface Combustion Co. 507
LAVA TIPS FOR INDUSTRIAL GAS BURNERS
American Lava Corpn. 486
LAVA GAS TIPS AND BURNERS FOR INDUSTRIAL HEATING
American Lava Corpn. 582
AUTOMATIC BOILER FEED SYSTEMS
P. M. Lattner Mfg. Co. 287
FURNACES, TORCHES, BURNERS FOR HEATING, SOLDERING, METAL-MELTING, HEAT TREATING
Johnson Gas Appliance Co. 526
GAS FIRED HGH PRESSURE BOILERS
P. M. Lattner Mfg. Co. 286
PROFITABLE BAKING
Bruce McDonald Co. 39
THE RED DEVIL OVEN
Bruce McDonald Co. 38
LINOTYPE TEMPERATURE CONTROL
Robertshaw Thermostat Co. 418
The Partlow Corpn. 637
LAVA FOR MECHANICAL AND ELECTRICAL PURPOSES
American Lava Corpn. 487
MANTLE RECUPERATORS
Surface Combustion Co. 515
NEW PROCESS OF NITRIDING
Surface Combustion Co. 508
MONOTYPE TEMPERATURE CONTROL
Robertshaw Thermostat Co. 419
The Partlow Corpn. 638
UNIVERSAL CONTACTORS FOR INDICATING TEMPERATURE
The Partlow Corpn. 636
METAL MELTING POT TEMPERATURE CONTROLLER
Robertshaw Thermostat Co. 420
The Partlow Corpn. 639
MOTION IN BAKING
Bruce McDonald Co. 501
JOHNSON DIRECT JET FURNACES AND APPLIANCES
Johnson Gas Appliance Co. 554
THERMOSTATIC HEAT CONTROL FOR COFFEE URNS AND STEAM TABLES
Johnson Gas Appliance Co. 530
JOHNSON INDUSTRIAL GAS APPLIANCES
Johnson Gas Appliance Co. 531
SAFETY GAS VALVES FOR INDUSTRIAL FURNACES, OVENS AND POTS
The Partlow Corpn. 640

HOUSE HEATING

ARCHITECT'S CATALOG
American Gas Products Corpn. 246
AUTOMATIC UNIFORM HEAT
Roberts-Gordon Appliances Corpn. 551
BOILER TRADE CATALOG
American Gas Products Corpn. 245
BOILER CONSUMER CATALOG
American Gas Products Corpn. 244

(Continued on page 114)

BOOTH 802

Come and be Welcome!

Improved Equipment-Russell Engineering Corporation

Engineers—Builders

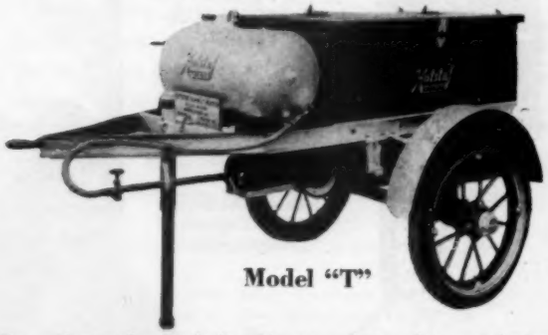
24 State Street New York, N. Y.

ESPECIALLY DESIGNED

MOHAWK HI-SPEED TRAILER FOR Hotstuf

GAS COMPANIES PIPE LINE JOBS

All Mohawk Hi-Speed Tool Trailers have been designed in every detail with the aid of practical suggestions from men on the "firing line."
Compartments, trays and fastenings are built to hold every tool and supplies.
Made in 6, 7 and 8 foot lengths. Other sizes and special features made to your specifications.



Model "T"

The Hotstuf Asphalt Heater has the exclusive patented Elevated Melting Chamber Feature, and will deliver hot bitumen in fifteen minutes after lighting the torch, and will continue delivering it at a rate as high as 8,000 pounds in eight hours if you so desire it, with perfect temperature control.
Compare its melting capacity with other makes.

WRITE FOR CATALOGUE AND PRICES

MOHAWK ASPHALT HEATER CO., Schenectady, N. Y.

REFRACTORIES

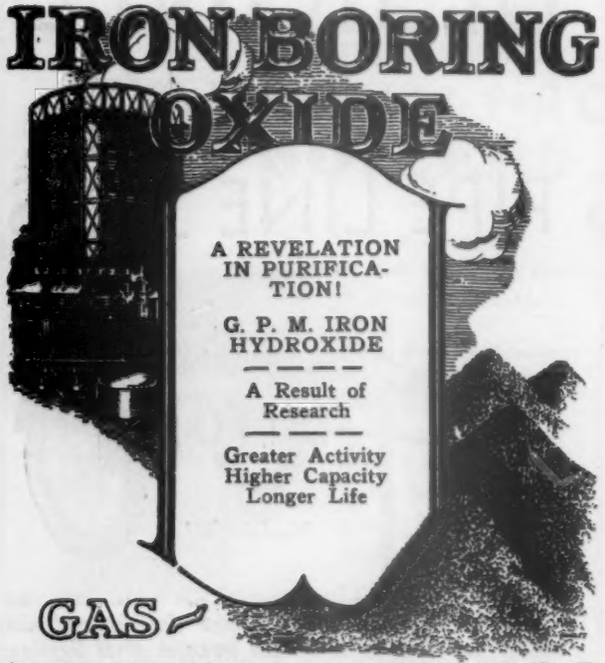
For Gas Appliances

Space heater radiants
Back walls
Tunnel radiants
Leaning baffles
Radiant sticks
Burner tips
Skeleton cups

See our exhibit
BOOTH 118
Atlantic City

Genceraco Refractories are made in all shapes and sizes, in color and in dense as well as porous materials. These refractories are unusually resistant to thermal shock and are physically strong. Now is the time to check over your refractory costs and quality. May we send you a quotation on your requirements?

GENERAL CERAMICS COMPANY
71 West 35th Street
New York, N. Y.



GAS PURIFYING MATERIALS COMPANY INC.

FOOT OF HALSEY STREET LONG ISLAND CITY
NEW YORK
BRANCH YARD—PROVIDENCE, R. I.

TRADE CATALOGS

(Continued from page 112)

CONVERSION BURNERS FOR ALL FURNACES AND BOILERS
Barber Gas Burner Co. 469
FOR SECTIONAL BOILERS
Robert-Gordon Appliance Corp.
HOMESTEAD FIRES
The Homestead Heater Co. 19
HOUSE HEATING DATA BOOK
Roberts-Gordon Appliance Corp. 340
HOUSE HEATING CATALOG
Surface Combustion Co. 589
IDEAL GAS BOILER HANDBOOK
American Gas Products Corpn. 243
NEW JOHNSON CONVERSION BURNER
Johnson Gas Appliance Co. 532
SALES ALBUM
Barber Gas Burner Co. 467
SALES LITERATURE
Barber Gas Burner Co. 468
HOUSE HEATING FURNACES
Geo. D. Roper Corpn 491
TRANSFORM BY GAS
The Barber Gas Burner Co. 606
SELL HEALTH AND COMFORT IN THE HOME
Roberts Gordon Appliance Co. 427
SELLING THE HOME HEATING MARKET
Roberts Gordon Appliance Co. 607
LET STAT-AMATIC REGULATE YOUR GAS FURNACE
Stat-amatic Instrument & Appliance Co. 622
STAT-AMATIC IN HOMES
Stat-amatic Instrument & Appliance Co. 623
THE DUAL THERMOSTAT
Stat-amatic Instrument & Appliance Co. 624
STAT-AMATIC MOTORIZED VALVES
Stat-amatic Instrument & Appliance Co. 625

RANGES

THE CAREFREE HOSTESS
American Stove Co. 252
SUNDAY DINNER
American Stove Co. 251
THE SECRET OF HAPPY HOMES
American Stove Co. 250
GAS RANGES
American Stove Co. 253
ADVERTISING MANUAL
George D. Roper Co. 48
MERCHANDISING GAS APPLIANCES TO THE HOUSEWIFE
Geo. D. Roper Corpn. 49
RANGE CATALOG
Geo. D. Roper Corpn. 51
RANGE CATALOG
New Process Stove Co. 260
RANGE CATALOG
Dangler Stove Co. 261
RANGE CATALOG—ORIOLE GAS RANGES
Standard Gas Equipment Corpn. 346
Standard Gas Equipment Corpn. 347
RANGE CATALOG—ACORN GAS RANGES
Standard Gas Equipment Corpn. 348
RANGE CATALOG—VULCAN HEAVY DUTY COOKING EQUIPMENT
Standard Gas Equipment Corpn. 349
ROPER GAS RANGES—APPLIANCES
Geo. D. Roper Corpn. 288
SALESMAN'S MANUAL
Geo. D. Roper Corpn. 50
RANGE CATALOG—SMOOTH TOP GAS RANGES
SNAP ACTION THERMOSTAT FOR STORAGE WATER HEATERS & HOUSE-HEATING EQUIPMENT
Robertshaw Thermostat Co. 400
THROTTLING TYPE WATER HEATER THERMOSTAT
Robertshaw Thermostat Co. 401
THERMOSTAT BULLETINS
Robertshaw Thermostat Co. 492
THERMOSTAT FOR SPACE HEATERS, GARAGE HEATERS, ETC.
Robertshaw Thermostat Co. 402
UNIT-OR GAS-FIRED HEATER
American Gas Products Corpn. 459
A. G. P. GAS-FIRED STEAM RADIATORS, UNVENTED AND VENTED
American Gas Products Corpn. 460
VULCAN GAS APPLIANCES
Standard Gas Equipment Corpn. 350

PILOTS & CONTROL

"PATROL" PILOT AND TEMPERATURE CONTROL
The Patrol Valve Co. 608
SAFETY PILOTS FOR COIL WATER HEATERS
Spencer Thermostat Co. 403
SAFETY PILOTS FOR BARBER BURNERS
Spencer Thermostat Co. 404
THERMOSTATS FOR CONVERTING TANK WATER HEATERS INTO AUTOMATIC STORAGE SYSTEM
Spencer Thermostat Co. 405
SELF-CLOSING TEMPERATURE RELIEF VALVES FOR THE PROTECTION OF HOT WATER BOILERS
Spencer Thermostat Co. 406
THERMOLATOR OVEN HEAT CONTROL
Milwaukee Gas Specialty Company 630

REFRIGERATION

APARTMENT HOUSE BOOK
Electrolux Refrigerator Sales, Inc. 493
ARCHITECTS MANUAL
Electrolux Refrigerator Sales, Inc. 494
GENERAL CONSUMER BOOKLET
Electrolux Refrigerator Sales, Inc. 495
SECRET OF SILENCE IN REFRIGERATION
Electrolux Refrigerator Sales, Inc. 301

WATER HEATING

THE UTILITY CONSTANT HOT WATER
Welsbach Co. 72
KOMPAK BOOK
Kompak Co. 263
WARM FRIENDS (RADIANT GAS HEATERS)
Welsbach Co. 71

PAINT

QUIGLEY TRIPLE-A PROTECTIVE COATINGS
Quigley Company 345
TECHNICAL PAINTS
Cheesman-Elliot Co., Inc. 553
PROTECT AND DECORATE
Quigley Furnace Specialties Co. 487

MISCELLANEOUS

ALCO CARBIDE GAS BURNERS, FIXTURES AND LIGHTING ACCESSORIES
American Lava Corpn. 36
HAWKS GAS FILTER
Hugo Mfg. Co. 580
HAWKS LINE OF GAS APPLIANCES
Hugo Mfg. Co. 581

EDITOR, AMERICAN GAS JOURNAL, 53 PARK PLACE, NEW YORK

Please send (at no expense to me) the following booklets.
(Insert numbers from list)

.....

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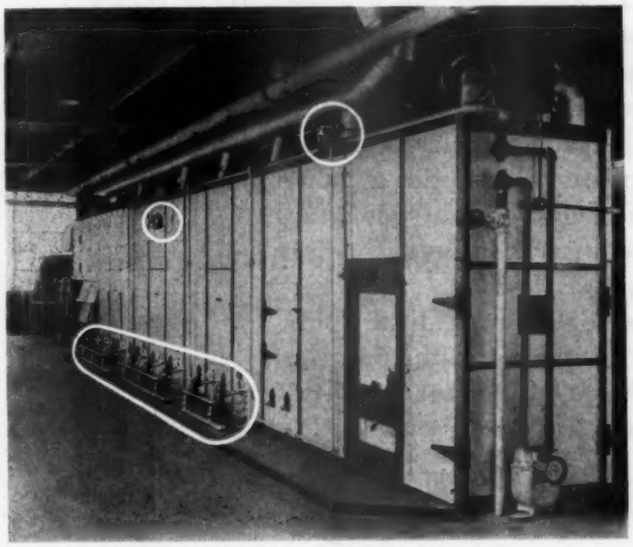
Name .....*Position* .....

Company .....

Address .....

AMERICAN GAS ASSOCIATION CONVENTION
ATLANTIC CITY—OCTOBER 12th-16th



VISIT BOOTH

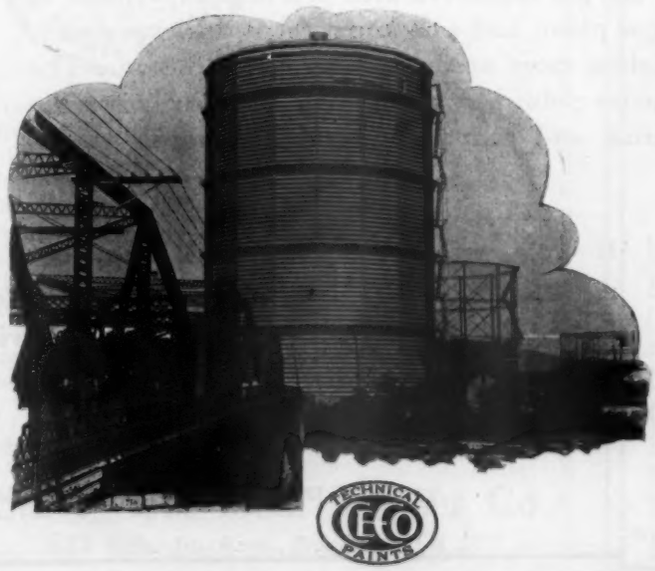
718

On the corner—near the stage—and see these Safety Gas Valves and Pilots in operation. Also Temperature Controls, Contactors and Gas Burning Equipment.

Soft Metal Melting can now be done with absolute safety, at a tremendous decrease in gas consumption and increased production. Come in and let us demonstrate this to you.

THE PARTLOW CORPORATION
NEW HARTFORD *(Suburb of Utica)* **N. Y.**

Ce-Co Technical Paints Stand the Test of Time



FOR more than 50 years Ce-Co paint specialists have been developing special formulae for specific conditions. That these technical paints fulfill their purpose is evidenced by their wide use in industrial plants in combating extreme and unusual conditions.

Take the gas industry, for example—large users of Ce-Co Technical Paints to protect gas holders, tanks and other structures. Conditions here are severe but Ce-Co Technical Paints have proved highly successful because they were developed to meet conditions peculiar to the industry.

Ce-Co Technical Paints lower maintenance costs.

For longer service, better protection and lasting good appearance of your holders specify and use
CE-CO GAS HOLDER PAINT

CHEESMAN-ELLIOT CO., Inc.
Established 1876
Technical Paint Makers
639-647 KENT AVE., BROOKLYN, N. Y.

Gas Business in the '60's

Way back in the '60's when traveling facilities were not so good, gas men could not gather at annual conventions as they do now to exchange ideas on up-to-date methods of gas production, distribution and sales. But these ideas were exchanged nevertheless. The gas industry was one of the first industries to have a trade paper to keep it advised of the developments of gas both at home and abroad. In 1859 the American Gas Light Journal was established and has been serving the gas industry continuously ever since—now under the name of American Gas Journal.

In going over the old file of issues since 1859, there is little doubt as to the important part this publication has played in the progress of gas. Policies advocated by its editors and managers were adopted for the betterment of the industry.

— *and Today!*

The advent of natural gas long distance transmission lines, the erection of liquefied gas plants for serving small communities, the use of gas for industrial purposes and the many additional applications of gas for domestic uses, have made this industry one of the largest in the country.

Gas men must have access to authoritative information on this rapidly expanding industry to keep abreast of the times.

In 1931 the American Gas Journal is still keeping pace with every development of the gas industry. Published in its pages each month are articles written by prominent gas men on up-to-date topics of vital interest.

These articles are usually selected and in many cases outlined by the editors who are gas engineers with practical experience in the operation of a gas plant, and who know, from this experience, the type of information most needed by the gas industry. The majority of the articles published are written exclusively for the American Gas Journal and cannot be secured from any other source.

AMERICAN GAS JOURNAL,
53 Park Place, N. Y.

Please enter my subscription to The American Gas Journal for one year at $2.00 per year.

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AMERICAN GAS JOURNAL

53 Park Place, N. Y.

BAROMETERS

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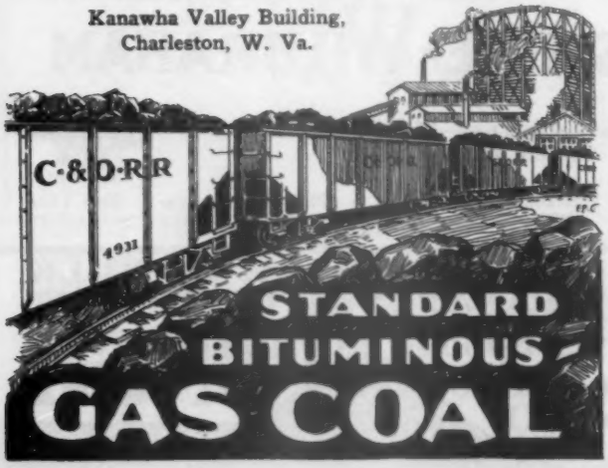

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ALPHABETICAL LIST OF ADVERTISERS

Alpha Lux Co., Inc. ..... Front Cover
American Cast Iron Pipe Co. 20
American Meter Company 12-13
American Stove Company 95
American Gas Products Corp. 30
Amherst Logan County Coal Corporation .. 120
Andale Co. 117
Associated Gas & Elec. Co. 111

Barber Gas Burner Co., The 33
Bartlett Hayward Co. 34
Byllesby Engineering & Management Corp. 112

Cast Iron Pipe Research Ass'n. 6-7
Chace Valve Co., W. M. 118
Chaplin-Fulton Mfg. Co. 110
Cheesman Elliot Co. 115
Cleveland Trencher Co., The 2
Connelly Iron Sponge & Governor Co. 119
Connersville Blower Co. 11-119
Consolidated Gas Company of New York .. 32
Cruse-Kemper Co. 9

Darling Valve & Mfg. Co. 24
Dresser, S. R., Mfg. Co. 22

Electrolux Sales Corp. 104

Gas Engineering Co. 119
Gas Machinery Co. 119
Gas Purifying Materials Co. 114
General Ceramics Company 114
General Gas Light Co. 109
Grand Rapids Loose Leaf Binder Co. 119
Groble Gas Regulator Co. 118

Homestead Heater Co. 120
Hunt Co., C. W. 106

Improvement Equipment-Russell Engr. Co. 113
International-Stacey Corp. 11-119
Isbell Porter Co. 120

Johnson Gas Appliance Co. 101
Johns-Manville 21

Kitson Company 31
Kompak Company 98

Lambert Meter Co. 118
Lattner Mfg. Co., P. M. 112
Lavino & Co., E. J. 25-120
Linde Air Products Co. 10
Lovekin Water Heater Co. 107

McClintic-Marshall Co. 118
McWane Cast Iron Pipe Co. 23
Mears-Kane-Ofeldt, Inc. 108
Mohawk Asphalt Heater Co. 113
Mueller Co. 18

National Tube Company 27
North American Light & Power Co. 28

Partlow Corp., The 115
Philfuels Company 8
Pittsburgh Equitable Meter Co. 16-17
Precision Thermometer & Instrument Co. .. 117

Quigley Co. 78

Reynolds Gas Regulator Co. 26
Roberts-Gordon Appliance Corp. 93
Robertshaw Thermostat Co. 103
Roots Co., P. H. & F. M. 11-119
Roper Corp., Geo. D. 100

Safety Gas Main Stopper Co. 117
Semet-Solvay Engineering Co. 5
Sprague Meter Co. ..... Fourth Cover
Stacey Bros. Gas Construction Co. 11
Stacey Manufacturing Co. 14-15
Stat-Amatic Instrument & Appliance Co. .. 105
Standard Gas Equipment Corp. 102
Superior Meter Co. ..... Third Cover
Surface Combustion Corporation 96-97

Tagliabue Mfg. Co., C. J. 29

Unger, John S. 119
Union Carbide & Carbon Corp. 10
United Engineers & Constructors, Inc. 75-76-77
United States Pipe & Foundry Co. 19

Welsbach Company 99
West Gas Improvement Co. 4
Wilbraham-Green Co. 11-119
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